TO: ALL HOLDERS OF INBOARD LEADING EDGE SLAT DRIVE ROTARY ACTUATOR ASSEMBLY COMPONENT MAINTENANCE MANUAL 27-81-01

REVISION NO. 14 DATED MAR 01/02

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.	DESCRIPTION OF CHANGE
REPAIR 1-1 602	Deleted sealant from DU bearing installation.
REPAIR 2-1 601	Added cadmium plate as optional finish on CRES repair bushing.
REPAIR 2-1 603-605	Added details of DU bearing journal repair on ring gear.
REPAIR 3-1 601 701-702 1008,1010	Deleted replacement of cork plugs.
REPAIR 3-1 601-602	Added procedures to repair corrosion in the planet gear bore.
1006	Updated item numbers in illustration.

BOEING

COMPONENT
MAINTENANCE MANUAL

INBOARD LEADING EDGE SLAT DRIVE ROTARY ACTUATOR ASSEMBLY

PART NUMBERS 256T2110-2,-3,-4

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

59647

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
		PRR B10337	OCT 10/82
		PRR B11543	APR 10/87
	TR 27-10		APR 01/88
SB-27-0068R1			JUL 01/90

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COMPONENT
MAINTENANCE MANUAL

TABLE OF CONTENTS

*[1] Special instructions not required. Use standard industry practices and information contained in 20-30-03.

INTRODUCTION

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

This manual is divided into separate sections:

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

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

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

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

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

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

Verification:

Disassembly: APR 7/86
Assembly: APR 7/86

INBOARD LEADING EDGE SLAT DRIVE ROTARY ACTUATOR ASSEMBLY

DESCRIPTION AND OPERATION

1. Description

A. The inboard leading edge slat drive rotary actuator assembly consists of a sun gear, five planet gears, a pair of end ring gears, and a gear arm. The actuator assembly is used to deploy the inboard leading edge slats. Two actuators are used on each of the two slats.

2. Operation

A. Input power to the sun gear is transmitted through the planet gears to the ring gears and gear arm. The ring gears are fixed to wing structure, while the arm rotates to extend the slat.

3. Leading Particulars (Approximate)

A. Length -- 13 inches

B. Width -- 4 inches

C. Depth -- 7 inches

D. Weight -- 16 pounds

E. Total gear ratio -- (-) 42.7:1

DISASSEMBLY

NOTE: Disassemble this component only as necessary to complete fault isolation, determine the serviceability of parts, perform required repairs, and restore the unit to serviceable condition.

1. Parts Replacement (Ref IPL Fig. 1)

   NOTE: The following parts are recommended for replacement. Unless otherwise specified, actual replacement of parts may be based on in-service experience.

   A. Seals (15)

   B. Retaining rings (5)

2. Disassembly (Ref IPL Fig. 1)

   A. Remove retaining rings (5) and washers (10).

   B. Remove ring gear assemblies (20, 45) with seals (15).

      NOTE: Do not remove end covers (25, 50) from ring gears unless necessary for repair or replacement.

   C. Remove flanged bearings (70).

   D. Slide planet gears (85), or planet gear assemblies (86), and the sun gear (80) out of the gear arm assembly (90) and separate gears. Remove planet rings (75) from the sun gear.

      NOTE: Do not remove cork plugs (83, 87) from planet gears (85, 88) unless necessary for repair or replacement.

      NOTE: Do not remove nameplate (110), DU bearings (92), or bushings (95, 100) from arm assembly unless necessary for repair or replacement.

CHECK

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

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

3. Do a magnetic particle check of the following parts. Refer to 20-20-01.

   A. Ring gear (30, 55)

   B. Gear arm (105)

   C. Planet gear (85, 88).

   D. Planet ring (75)

   E. Sun gear (80)

4. Do a penetrant check of end covers (25, 50). Refer to 20-20-02.

5. Check gear teeth and splines for uneven wear.

6. Check that teflon surface of DU bearing (92) is not scratched or damaged.

REPAIR - GENERAL

1. Content

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

P/N	NAME	REPAIR
256T2111	ARM, GEAR	1-1
256T2112	GEAR, RING	2-1
256T2113	GEAR, PLANET	3-1
256T2114	GEAR, SUN	4-1
256T2116	COVER, END	5-1
256T2117	COVER, END	5-1
256T2123 256T2277	NAMEPLATE	6-1
- -	MISC PARTS REFINISH	7-1

2. Standard Practices

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

20-30-02 Stripping of Protective Finishes
20-30-03 General Cleaning Procedures
20-41-01 Decoding Table for Boeing Finish Codes
20-42-02 Low Hydrogen Embrittlement Cadmium-Titanium Alloy Plating
20-42-10 Low Hydrogen Embrittlement Stylus Cadmium Plating
20-42-05 Bright Cadmium Plating
20-50-03 Bearing and Bushing Replacement
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
20-60-04 Miscellaneous Materials

3. Materials

NOTE: Equivalent substitutes may be used.

A. Primer -- BMS 10-11, Type 1 (Ref 20-60-02)

B. Adhesive -- Type 70 (Ref 20-50-12)

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

4. Dimensioning Symbols

A. Standard True Positioning Dimensioning Symbols used in applicable repair procedures are shown in Fig. 601.

—	STRAIGHTNESS
▱	FLATNESS
⊥	PERPENDICULARITY (OR SQUARENESS)
//	PARALLELISM
○	ROUNDNESS
⌭	CYLINDRICITY
⌒	PROFILE OF A LINE
⌓	PROFILE OF A SURFACE
◎	CONCENTRICITY
≡	SYMMETRY
∠	ANGULARITY
↗	RUNOUT
↗↗	TOTAL RUNOUT
⌴	COUNTERBORE OR SPOTFACE
∨	COUNTERSINK

⌖	THEORETICAL EXACT POSITION OF A FEATURE (TRUE POSITION)
∅	DIAMETER
S ∅	SPHERICAL DIAMETER
R	RADIUS
SR	SPHERICAL RADIUS
()	REFERENCE
BASIC (BSC) OR [DIM]	A THEORETICALLY EXACT DIMENSION USED TO DESCRIBE SIZE, SHAPE OR LOCATION OF A FEATURE FROM WHICH PERMISSIBLE VARIATIONS ARE ESTABLISHED BY TOLERANCES ON OTHER DIMENSIONS OR NOTES.
[-A-]	DATUM
Ⓜ	MAXIMUM MATERIAL CONDITION (MMC)
Ⓛ	LEAST MATERIAL CONDITION (LMC)
Ⓢ	REGARDLESS OF FEATURE SIZE (RFS)
Ⓟ	PROJECTED TOLERANCE ZONE
FIM	FULL INDICATOR MOVEMENT

EXAMPLES

[— | 0.002]	STRAIGHT WITHIN 0.002
[⊥ | 0.002 | B]	PERPENDICULAR TO B WITHIN 0.002
[// | 0.002 | A]	PARALLEL TO A WITHIN 0.002
[○ | 0.002]	ROUND WITHIN 0.002
[⌭ | 0.010]	CYLINDRICAL SURFACE MUST LIE BETWEEN TWO CONCENTRIC CYLINDERS, ONE OF WHICH HAS A RADIUS 0.010 INCH GREATER THAN THE OTHER
[⌒ | 0.006 | A]	EACH LINE ELEMENT OF THE SURFACE AT ANY CROSS SECTION MUST LIE BETWEEN TWO PROFILE BOUNDARIES 0.006 INCH APART RELATIVE TO DATUM PLANE A
[⌓ | 0.020 | A]	SURFACES MUST LIE WITHIN PARALLEL BOUNDARIES 0.02 INCH APART AND EQUALLY DISPOSED ABOUT TRUE PROFILE

[◎ | ∅ 0.0005 | C]	CONCENTRIC TO C WITHIN 0.0005 DIAMETER
[≡ | 0.010 | A]	SYMMETRICAL WITH A WITHIN 0.010
[∠ | 0.005 | A]	ANGULAR TOLERANCE 0.005 WITH A
[⌖ | ∅ 0.002 Ⓢ | B]	LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE
[⊥ | ∅ 0.010 Ⓜ | A] [0.510 Ⓟ]	AXIS IS TOTALLY WITHIN A CYLINDER OF 0.010-INCH DIAMETER, PERPENDICULAR TO, AND EXTENDING 0.510-INCH ABOVE, DATUM A, MAXIMUM MATERIAL CONDITION
[2.000] OR 2.000 BSC	THEORETICALLY EXACT DIMENSION IS 2.000

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

True Position Dimensioning Symbols
Figure 601

GEAR ARM ASSEMBLY - REPAIR 1-1

256T2111-1, -2, -5, -7

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

1. Bushing Replacement (IPL Fig. 1)

   A. Remove bushing (95, 100).

   CAUTION: OVERSIZE BUSHING MAY HAVE BEEN INSTALLED DURING PRODUCTION. IF INSTALLED, REPLACEMENT BUSHING (95, 100) WILL NOT MEET INTERFERENCE REQUIREMENTS.

   B. Measure hole diameter for bushing (95, 100). If diameter is greater than design diameter as shown in Fig. 601, obtain oversize bushing per Table I (Fig. 601) or manufacture oversize bushing per Fig. 602.

   C. Install replacement bushing (95, 100) per 20-50-03. For gear arm assembly 256T2111-7, install replacement bushings (95, 100) with wet sealant per 20-50-03 and fillet seal with sealant.

   D. Machine bushing ID and chamfer to dimensions and finish shown in Fig. 601.

2. DU Bearing Replacement (IPL Fig. 1)

   A. Special Tools and Equipment

      NOTE: Equivalent tools or equipment can be used.

      (1) A27070-80 -- Bearing Installation Equipment

B. Procedure

(1) Remove the DU bearing (92).

(2) Use the bearing installation equipment A27070-80 to install the replacement DU bearing. Make sure that the bearing split line is located as shown in Fig. 601.

(3) Make sure that the difference between the inner diameters of the installed DU bearings is not more than 0.002 inch.

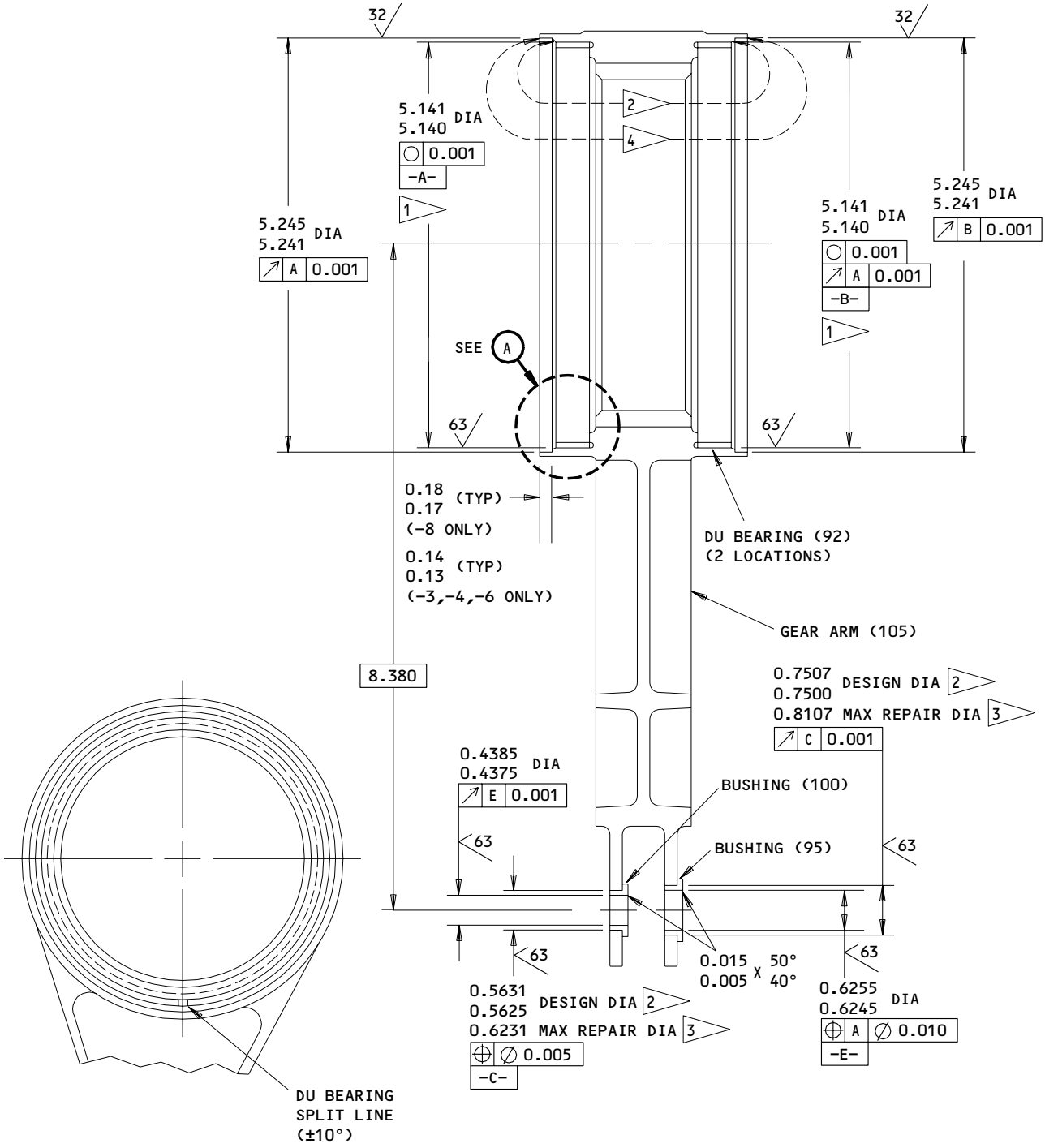
3. Bushing Hole Repair (Fig. 601)

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

B. Manufacture bushings (Fig. 602), as required, to compensate for amount of material removed.

C. Install bushings with wet sealant per 20-50-03.

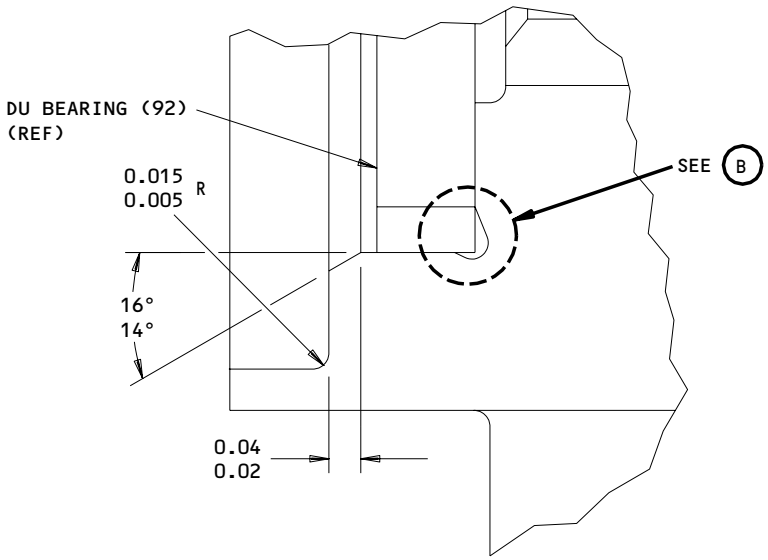
D. Machine bushing ID and chamfer to dimensions and finish shown in Fig. 601.



256T2111-1,-2,-5,-7

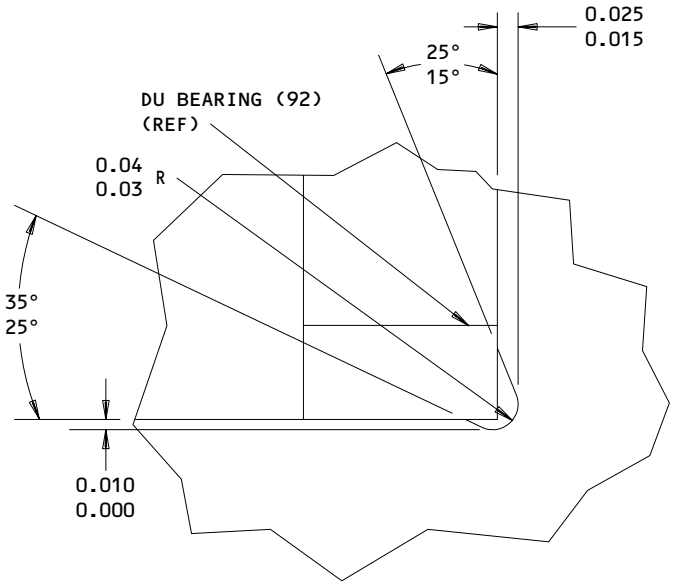
Gear Arm Assembly Repair
Figure 601 (Sheet 1)

59652



(NO SCALE, 2 LOCATIONS)

A



(NO SCALE, 2 LOCATIONS)

B

Gear Arm Assembly Repair
Figure 601 (Sheet 2)

A52822

OVERSIZE HOLE DIA (INCHES)	BUSHING PART NO.
0.5632-0.5638	256T2127-1
0.5639-0.5645	256T2127-2
0.5646-0.5652	256T2127-3
0.5653-0.5659	256T2127-4
0.5660-0.5666	256T2127-5
0.5667-0.5673	256T2127-6

OVERSIZE HOLE DIA (INCHES)	BUSHING PART NO.
0.7508-0.7515	256T2128-1
0.7516-0.7523	256T2128-2
0.7524-0.7531	256T2128-3
0.7532-0.7539	256T2128-4
0.7540-0.7547	256T2128-5
0.7548-0.7555	256T2128-6

BUSHING REPLACEMENT
TABLE I

REFINISH

GEAR ARM (105) -- CADMIUM-TITANIUM ALLOY PLATE (F-15.32) EXCEPT AS NOTED. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (F-20.02) EXCEPT AS NOTED.

1. FOR GEAR ARMS, 256T2111-3,-4,-6 ONLY, NO FINISH THESE SURFACES EXCEPT TEMPORARY COATING (F-25.01)
2. NO PRIMER ON THIS SURFACE FOR 256T2111-8 ONLY (BOTH SIDES)
3. REPAIR LIMIT FOR INSTALLATION OF OVERSIZE BUSHINGS
4. NO PRIMER ON THIS SURFACE FOR 256T2111-3,-4,-6 ONLY (BOTH SIDES)

REPAIR

REF 3

125 ALL MACHINED SURFACES EXCEPT AS NOTED

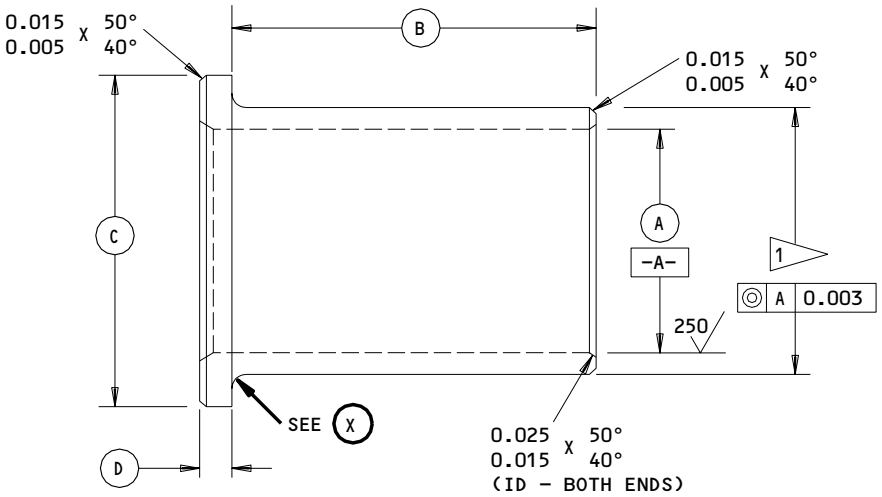
BREAK SHARP EDGES 0.005-0.015 R

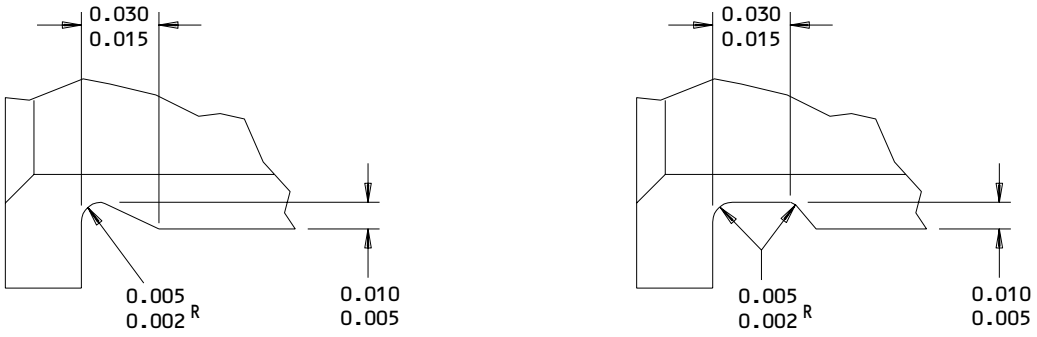
MATERIAL: 275-300 KSI
4340M STEEL

ALL DIMENSIONS ARE IN INCHES (BEFORE PLATING)

256T2111-1,-2,-5,-7

Gear Arm Assembly Repair
Figure 601 (Sheet 3)





UNDERCUT CONFIGURATIONS

X 2

ORIGINAL BUSHING NO. (REF)	A	B	C	D	INTERFERENCE (AFTER PLATING)
95, FIG. 1	0.615 0.609	0.150 0.145	0.890 0.880	0.068 0.063	0.0019 0.0005
100, FIG. 1	0.428 0.422	0.140 0.135	0.790 0.780	0.065 0.060	0.0017 0.0005

1 FINAL BUSHING OUTSIDE DIA EQUALS REPAIR DIA OF ARM PLUS INTERFERENCE (AFTER PLATING)

2 TYPE 1 OR TYPE 2 OPTIONAL

63 ALL MACHINED SURFACES, EXCEPT AS NOTED

MATERIAL: BUSHING (95) -- ALUMINUM-NICKEL BRONZE
BUSHING (100) -- 15-5PH CRES (180-200 KSI)

FINISH: CADMIUM PLATE (F-15.06) PLATING OPTIONAL IN BORE

ALL DIMENSIONS ARE IN INCHES

DIMENSIONS APPLY BEFORE PLATING

Oversize Bushing Details
Figure 602

RING GEAR ASSEMBLY - REPAIR 2-1

256T2112-1,-2,-4,-5

NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may only require stripping and restoration of original finish, refer to Refinish instruction, Fig. 602, and Repair 5-1.

1. End Cover Replacement (IPL Fig. 1) (Fig. 601)

   A. Remove end cover (25, 50) from ring gear assembly (20, 45).

   B. Install replacement cover with wet primer, BMS 10-11, type 1 (256T2112-1, -2) or wet sealant, BMS 5-95 (256T2112-4, -5). Stamp arrow and "OFFSET HOLE" as shown (Fig. 601). Make sure marker arrow points to offset hole (located at 2.935 in. radius from center of gear).

2. Mounting Hole Repair (IPL Fig. 1) (Fig. 602)

   A. Machine ring gear (30, 55) mounting hole as required, within repair limits shown on Fig. 602, to remove defects.

   B. Chamfer edge of hole 0.05 x 45 degrees.

   C. Do a magnetic particle check of the machined surface per 20-20-01.

   D. Stylus cadmium plate the machined hole per 20-42-10.

   E. Fabricate a repair bushing from 4340M steel or 17-4PH CRES to dimensions shown on Fig. 602. Refer to SOPM 20-10-02.

   F. Cadmium-titanium plate the bushing per SOPM 20-42-02. Optional: cadmium plate per SOPM 20-42-05 (for 17-4PH CRES bushing only).

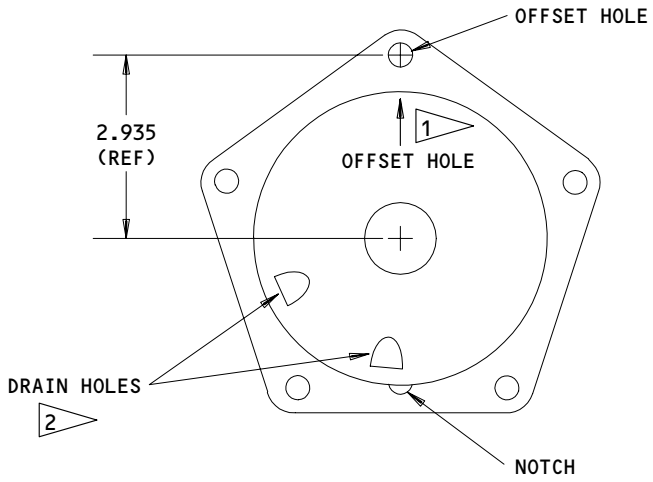
   G. Wet install repair bushing using shrink-fit method per 20-50-03 with BMS 5-95 sealant. Remove excess sealant after installation of bushing.

H. Machine the inside diameter of the installed repair bushing if necessary. Stylus cadmium plate the inside diameter per 20-42-10.

3. DU Bearing Journal Repair (IPL Fig. 1) (Fig. 602)

A. Machine or grind as required, within repair limit, to remove defects.

B. Shot peen, chrome plate per 20-42-03, and grind to design dimension and finish. Chrome plate thickness shall not exceed 0.010 after grinding.

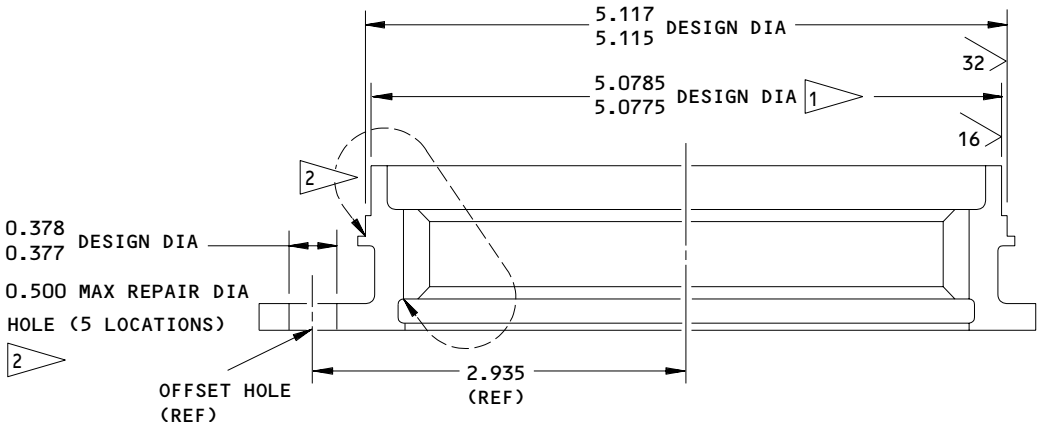


1 STAMP ARROW AND "OFFSET HOLE" AS SHOWN ON ALL ASSEMBLIES

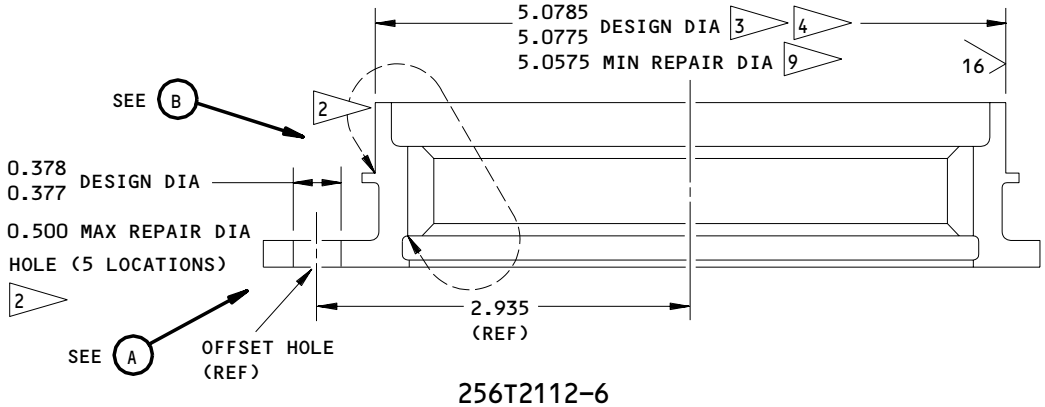
2 DRAIN HOLES ON COVER (25) ONLY

256T2112-1,-2,-4,-5
End Cover Replacement
Figure 601

301950



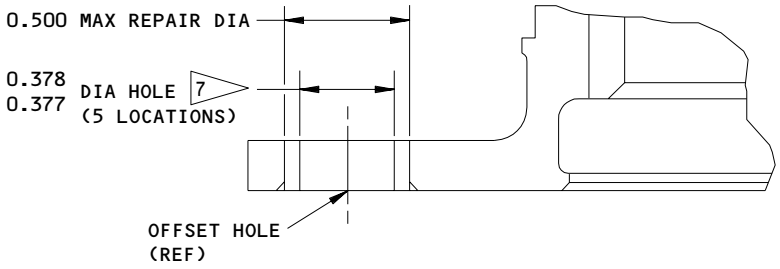
256T2112-3
(PRE SB 27-0068 R1)



256T2112-6
(POST SB 27-0068 R1)

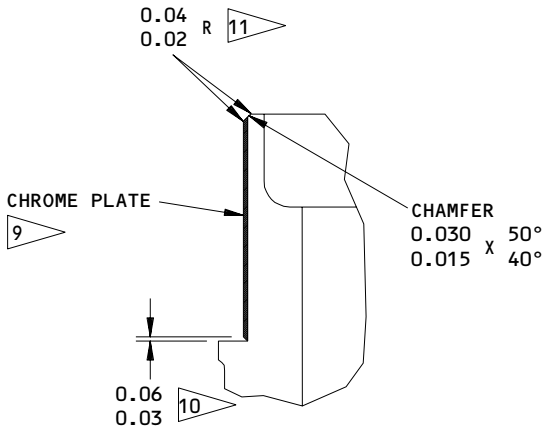
256T2112-1,-2,-4,-5
Ring Gear Repair and Refinish
Figure 602 (Sheet 1)

59654



REPAIR BUSHING INSTALLATION

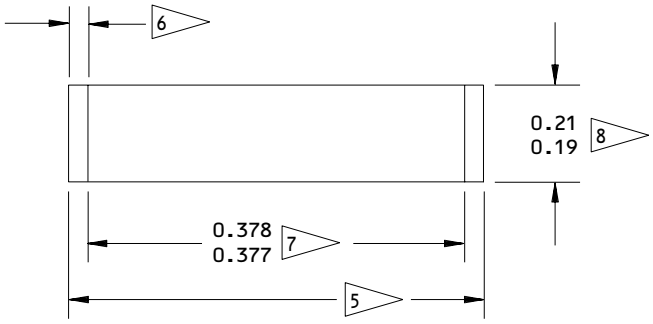
A



B

256T2112-1,-2,-4,-5
Ring Gear Repair and Refinish
Figure 602 (Sheet 2)

M44480



REPAIR BUSHING

REFINISH

RING GEAR (30,55) -- CADMIUM-TITANIUM ALLOY PLATE (0.0005-0.0007) (F-15.32) EXCEPT AS NOTED. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (F-20.02) EXCEPT AS NOTED

1. FOR 256T2112-3 ONLY, NO FINISH ON THIS SURFACE EXCEPT TEMPORARY COATING (F-25.01)
2. NO PRIMER THESE SURFACES
3. FOR 256T2112-6, NO CAD-TI PLATE THIS SURFACE
4. FOR 256T2112-6, THIN DENSE CHROME PLATE (F-14.892) 0.0003-0.0005 THICK AND 16 MICROINCHES FINISH. APPLY WIPE ON/WIPE OFF PRIMER (F-19.45) AFTER PLATING
5. REPAIR BUSHING OUTSIDE DIAMETER = REPAIR DIAMETER OF HOLE +0.0005 TO 0.001 INCH INTERFERENCE FIT
6. 0.03 INCH MINIMUM WALL THICKNESS
7. MACHINE AFTER INSTALLATION
8. BUSHING HEIGHT SHALL NOT EXCEED FLANGE THICKNESS
9. BUILD UP WITH CHROME PLATE AND GRIND TO DESIGN DIMENSIONS AND FINISH SHOWN. OBEY 10 AND 11
10. CHROME PLATE RUNOUT
11. NO SHARP EDGES ON RADIUS. BLEND RADIUS SMOOTHLY WITH ADJACENT SURFACES

REPAIR

9 10 11

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: RING GEAR -- 4340M STEEL 275-300 KSI

REPAIR BUSHING -- 4340M STEEL OR 17-4PH CRES 180-200 KSI

SHOT PEEN: (SOPM 20-10-03)
2.0 COVERAGE
170 SHOT SIZE
0.008-0.013A INTENSITY

ALL DIMENSIONS ARE IN INCHES (BEFORE PLATING)

256T2112-1,-2,-4,-5
Ring Gear Repair and Refinish
Figure 602 (Sheet 3)

837930

PLANET GEAR - REPAIR 3-1

256T2113-1, -2, -3

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

1. Cork Plug (83, 87) Replacement

NOTE: Corrosion can occur in the planet gear bore. To decrease the risk of corrosion, we recommend that you do not replace the cork plug (83, 87) in the planet gear (85, 88). If you remove the cork plug, add more grease to the actuator. Refer to ASSEMBLY/701, for the correct quantity of grease.

2. Corrosion Repair

A. Machine the bore of the planet gear (85, 88) as necessary to remove the corrosion damage. Machine the chamfer if necessary. Do not machine more than the limit shown. Refer to SOPM 20-10-02).

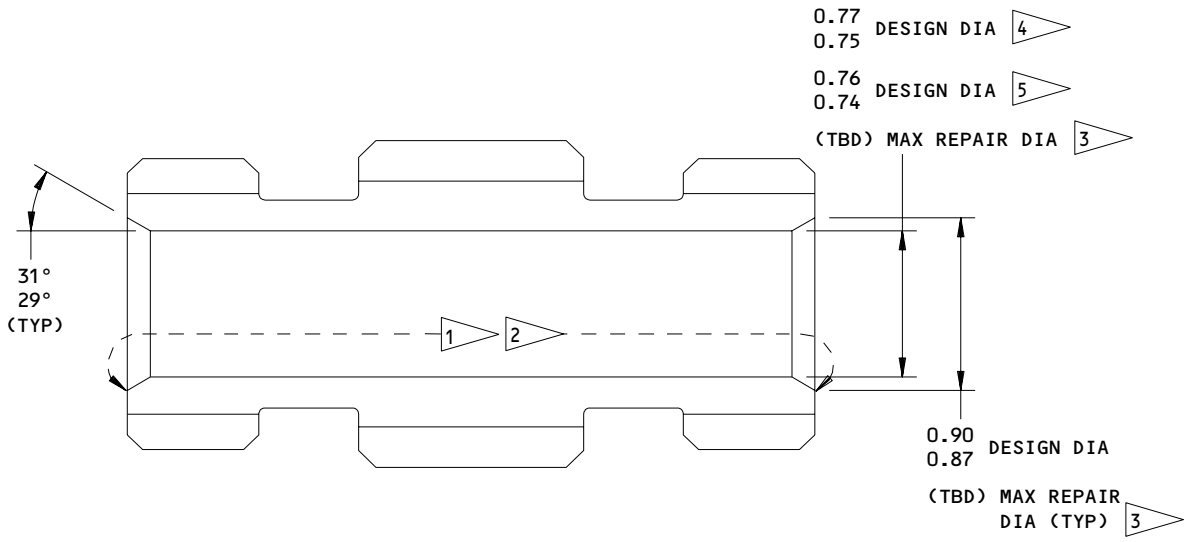
B. Break all sharp edges.

C. Do the necessary post-machining procedures. Refer to SOPM 20-10-02.

D. Do a magnetic particle check of the machined area. Refer to SOPM 20-20-01.

E. Cadmium-titanium plate (F-15.01) the machined surfaces. Refer to SOPM 20-42-02.

F. Apply BMS 10-11, type 1 primer to the bore, as shown in Fig. 601.



REFINISH

FOR 256T2113-1, CADMIUM-TITANIUM ALLOY PLATE (0.0005-0.0007 INCH THICK) AND APPLY PHOSPHATE TREATMENT (F-16.05) ALL OVER EXCEPT OMIT PLATING ON AREAS NOTED.

FOR 256T2113-2, CADMIUM-TITANIUM ALLOY PLATE ALL OVER AND APPLY CHROMATE POST PLATE TREATMENT (F-15.01).

1 FOR 256T2113-1, NO PLATING THESE SURFACES. PLATE THROW-IN ALLOWED. APPLY TWO COATS PRIMER BMS 10-11, TYPE 1 (F-20.03) AFTER PHOSPHATE TREATMENT

2 FOR 256T2113-2, APPLY TWO COATS PRIMER, BMS 10-11, TYPE 1 (F-20.03) AFTER CHROMATE POST PLATE TREATMENT

3 MACHINE AS NECESSARY TO REMOVE DEFECTS. CADMIUM-TITANIUM PLATE (F-15.01). RESTORATION TO DESIGN DIMENSIONS IS NOT REQUIRED

4 FOR 256T2113-1

5 FOR 256T2113-2

REPAIR

3

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: 4340M STEEL
275-300 KSI

ALL DIMENSIONS ARE IN INCHES

256T2113-1,-2,-3
Planet Gear Refinish
Figure 601

59656

SUN GEAR - REPAIR 4-1

256T2114-1, -2, -3

1. Plating Repair

   NOTE: Repair consists of stripping and restoration of original finish. Refer to Refinish instruction in Fig. 601 and to REPAIR-GEN for list of applicable standard practices.

2. Rulon Bushing Journal Repair (IPL Fig. 1) (Fig. 601)

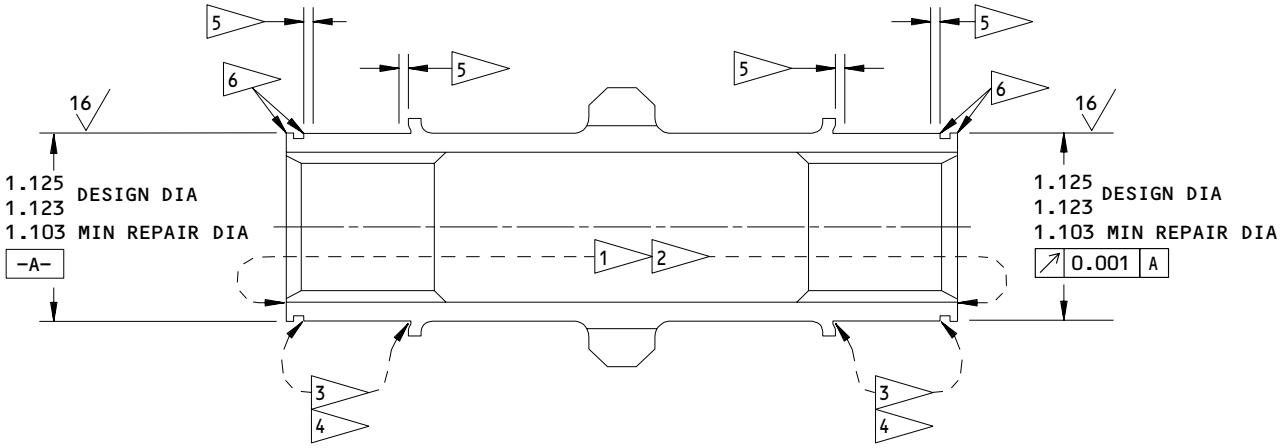
   A. Machine or grind as required per 20-10-02, within repair limit, to remove defects.

   B. Magnetic particle check per 20-20-01 the areas machined.

   C. Shot peen per 20-10-03 the areas machined.

   D. Chrome plate bushing journal thick enough to allow post-plate grinding per 20-42-03.

   E. Grind chrome plate to design dimension and finish per 20-10-04 and Fig. 601. Plate thickness shall not exceed 0.015 after grinding.



REFINISH

CADMIUM-TITANIUM ALLOY PLATE (0.0005-0.0007 THICK) ALL OVER AND APPLY PHOSPHATE TREATMENT (F-16.05) EXCEPT AS NOTED. APPLY CORROSION PREVENTIVE COMPOUND MIL-C-11796, CLASS 1 (F-19.03) AS NOTED

1. FOR 256T2114-1 ONLY, APPLY CORROSION PREVENTIVE COMPOUND (F-19.03) THESE SURFACES ONLY
2. FOR 256T2114-2,-3 ONLY, APPLY BMS 3-24 GREASE (F-19.13) TO INTERIOR. MINIMUM 0.05 THICK
3. FOR 256T2114-2,-3 ONLY, DO NOT CAD-TI PLATE THIS SURFACE
4. FOR 256T2114-2,-3 ONLY, THIN DENSE CHROME PLATE (F-14.892) 0.0003-0.0005 THICK AND 16 MICROINCHES FINISH. APPLY WIPE ON/WIPE OFF PRIMER (F-19.45) AFTER PLATING
5. 0.03-0.06 CHROME RUNOUT AREA
6. DO NOT MACHINE OR CHROME PLATE THIS AREA

REPAIR

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: 4340M STEEL
275-300 KSI

SHOT PEEN: (REF SOPM 20-10-03)
HARD SHOT (RC 55-65)
2.0 COVERAGE
110 MAX SHOT SIZE
0.010-0.015A INTENSITY

ALL DIMENSIONS ARE IN INCHES (BEFORE PLATING)

256T2114-1,-2,-3
Sun Gear Repair and Refinish
Figure 601

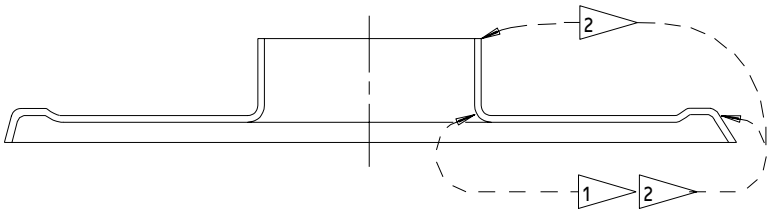
59653

END COVER - REPAIR 5-1

256T2117-1, -2
256T2116-1, -2

1. Plating Repair

NOTE: Repair consists of stripping and restoration of original finish. Refer to Refinish instruction in Fig. 601 and to REPAIR-GEN for list of applicable standard practices.



REFINISH

CADMIUM PLATE (F-15.06) AND APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (F-20.02) ON AREA NOTED

MATERIAL: 17-7PH CRES
150-170 KSI

1 FOR 256T2116-1 AND 256T2117-1, APPLY PRIMER THESE SURFACES ONLY

2 FOR 256T2116-2 AND 256T2117-2, APPLY PRIMER THESE SURFACES ONLY

256T2117-1,-2
256T2116-1,-2

End Cover Refinish
Figure 601

59660

NAMEPLATE - REPAIR 6-1

256T2123-1
256T2277-2

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

1. Nameplate Replacement

   A. Steel stamp nameplate, as required, per 20-50-10.

   B. Bend nameplate to conform to gear arm contour. Bond nameplate to arm per 20-50-12, Type 70, at location shown in IPL Fig. 1.

MISCELLANEOUS PARTS REFINISH - REPAIR 7-1

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

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Washer (10)	Al alloy	Chromic acid anodize (F-17.04) and apply one coat primer, BMS 10-11, type 1 (F-20.02) all over
Planet ring (75)	4340M steel 275-300 ksi	Cadmium-titanium alloy plate, 0.0005-0.0007 in. thick (F-15.32)
DU bearing (92)	Steel OD	Tin flash plate OD, 0.0002 in. maximum thickness

Refinish Details
Figure 601

ASSEMBLY

1. Materials

NOTE: Equivalent substitutes may be used.

A. Grease -- MIL-G-23827 (Ref 20-60-03) (Optional use on 256T2110-2)

B. Grease -- MIL-G-23827B (used on 256T2110-3, preferred use on 256T2110-2)

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

2. Equipment

NOTE: Equivalent substitutes may be used.

A. Assembly Equipment -- A27070-65 (Includes -63 assembly tool, -24 backlash test fixture, -55 input crank, and -45 bushing) (Replaces A27070-61, which can still be used)

B. Dial indicator

3. Lubrication

A. Assembly 256T2110-2 -- Apply a thin layer of grease to the gear and spline teeth, and to the bores of the planet gears (total weight 0.06 lb).

B. Apply thin layer of grease to the seals, bearings, and all faying surfaces.

4. Assembly (Ref IPL Fig. 1)

A. Install planet rings (75) on sun gear (80).

B. Arrange planet gears (85) or planet gear assemblies (86) around the sun gear, then place parts on assembly tool A27070-63 to hold planets at proper spacing per Fig. 701. Slide gear arm assembly (90) over gears, then remove assembly tool.

NOTE: Corrosion can occur in the planet gear bores. To decrease the risk of corrosion, we recommend that the cork plugs (83, 87) be removed from the planet gears (85, 88).

C. Install flanged bearings (70) into end covers on ring gear assemblies (20, 45). On 256T2110-3 and -4, install bearings (70) with wet sealant and fill gap on exterior between bearing and end covers (25, 50) with sealant.

D. On 256T2110-3 and -4, fill the actuator with 4.0-6.0 oz of grease.

NOTE: If the cork plugs (83, 87) are omitted, fill the planet gear bores with grease. The weight of grease shown is in addition to the amount put in the bores.

CAUTION: GEAR ARM, PLANET GEARS, AND RING GEARS MUST BE ALIGNED EXACTLY PER FIG. 701 OR ASSEMBLY MAY NOT FUNCTION PROPERLY ON AIRPLANE.

E. On 256T2110-2, install ring gear assemblies (20, 45) with the Quad-X seals (15) into the gear arm assembly (40). On 256T2110-3 and -4, make sure that the Omniseals (15A) are completely coated with grease, then install the Omniseals in the gear arm, as shown in Fig. 701. Install the ring gear assemblies into the gear arm with care, to prevent damage to the seals. Check that the ring gears are aligned with the gear arm per Fig. 701, and that the offset holes in each ring gear are in line.

F. Install washers (10) as required on each end of sun gear to obtain 4.02-4.06 in. assembly width with ring gear flanges pulled apart (Ref Fig. 701). Install at least one washer on each end. Secure assembly with retaining rings (5).

G. Check backlash

(1) Prior to installing rotary actuator assembly into backlash test fixture A27070-24, position force gauge assembly of fixture in "POS 1".

(2) Install rotary actuator assembly into fixture by bolting actuator flange to fixture.

(3) Install input crank assembly A27070-55 into input spline of actuator. Expand spline by tightening spline expander. Bolt handle of input crank assembly to hole provided in fixture.

(4) Secure output arm of actuator to force gauge assembly using bushing A27070-45.

(5) Install magnetic base dial indicator on steel indicator pad on backlash test fixture.

(6) Apply 120 pound load to output arm in both directions and measure backlash. Backlash shall not exceed 0.117 inch FIM at point of load application (8.38 inches moment arm).

NOTE: This backlash corresponds to a maximum angular displacement of 0.8 degree with application of 1000 pound-inch torque in each direction.

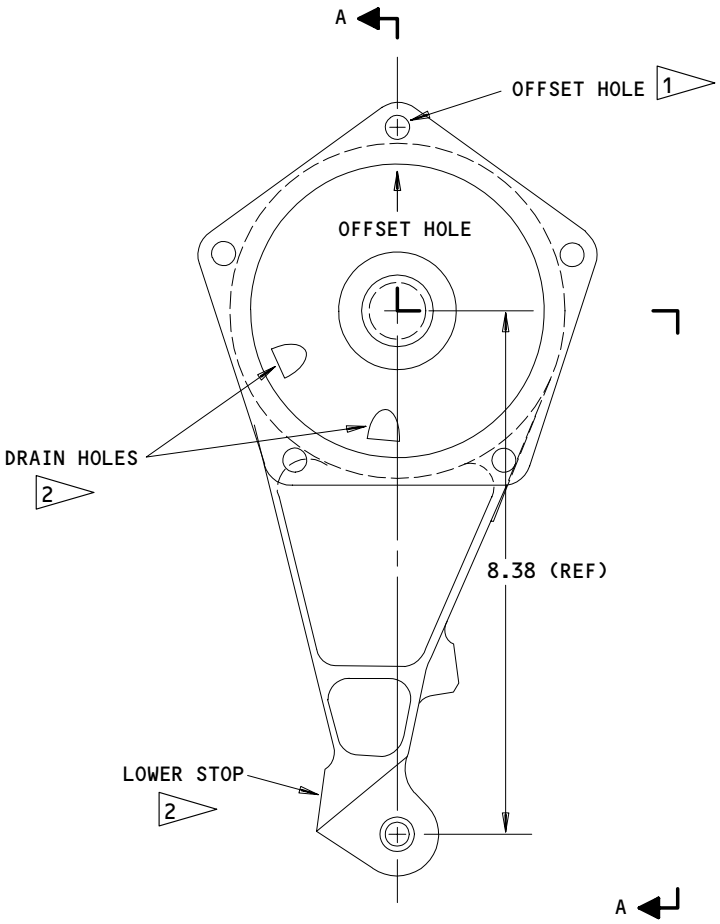
H. Check no-load input torque

(1) Using spline adapter, rotate sun gear through at least 2 complete revolutions with no load on the gear arm. Check that input torque does not exceed 8.0 lb-in.

I. Touch up damaged surface finishes, as required, per 20-41-02.

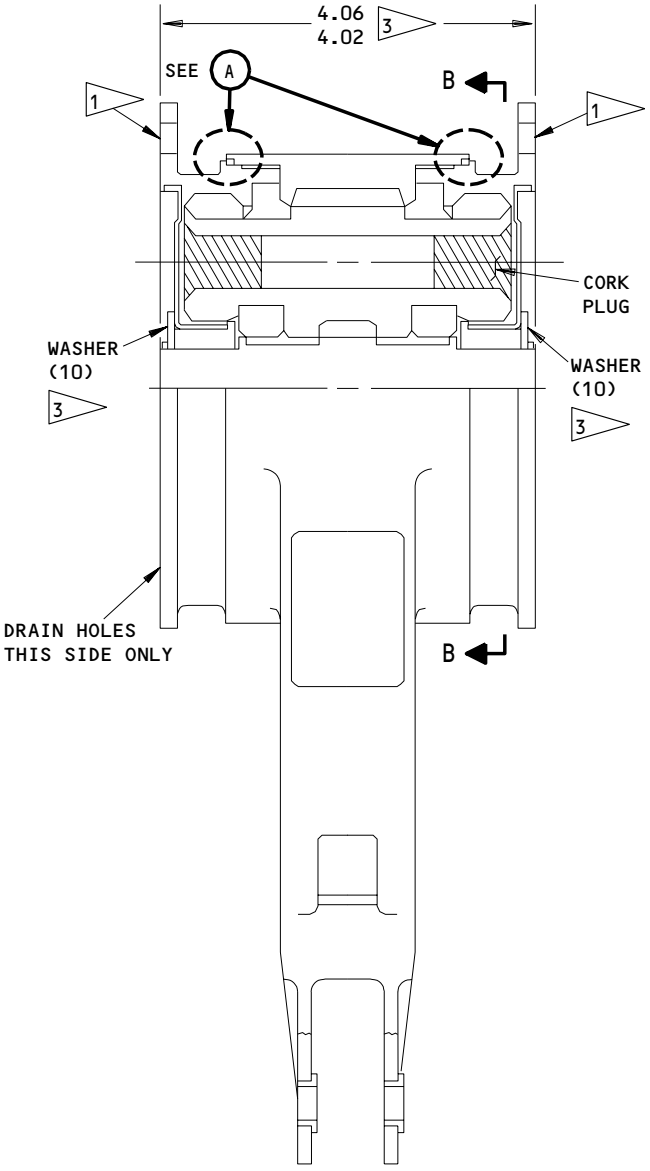
5. Storage

A. Use standard industry practices and information contained in 20-44-02 to store this component.

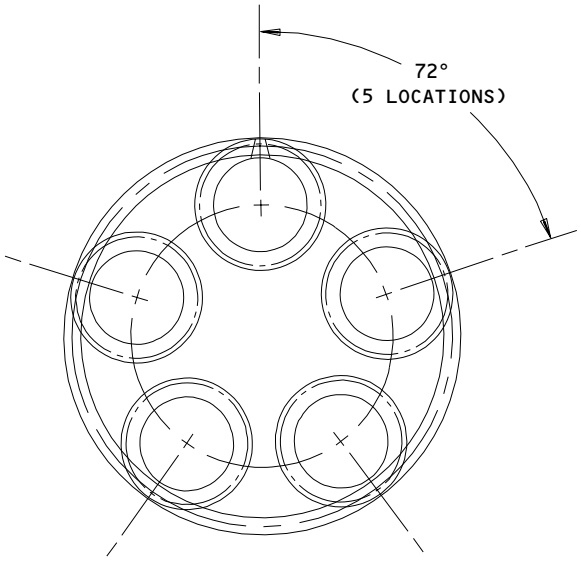


RING GEAR ASSEMBLY (20,45) INSTALLATION

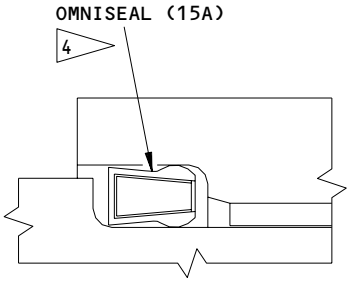
Assembly Details
Figure 701 (Sheet 1)



A-A



REQUIRED TIMING FOR
PLANET GEAR (85) INSTALLATION
B-B



A

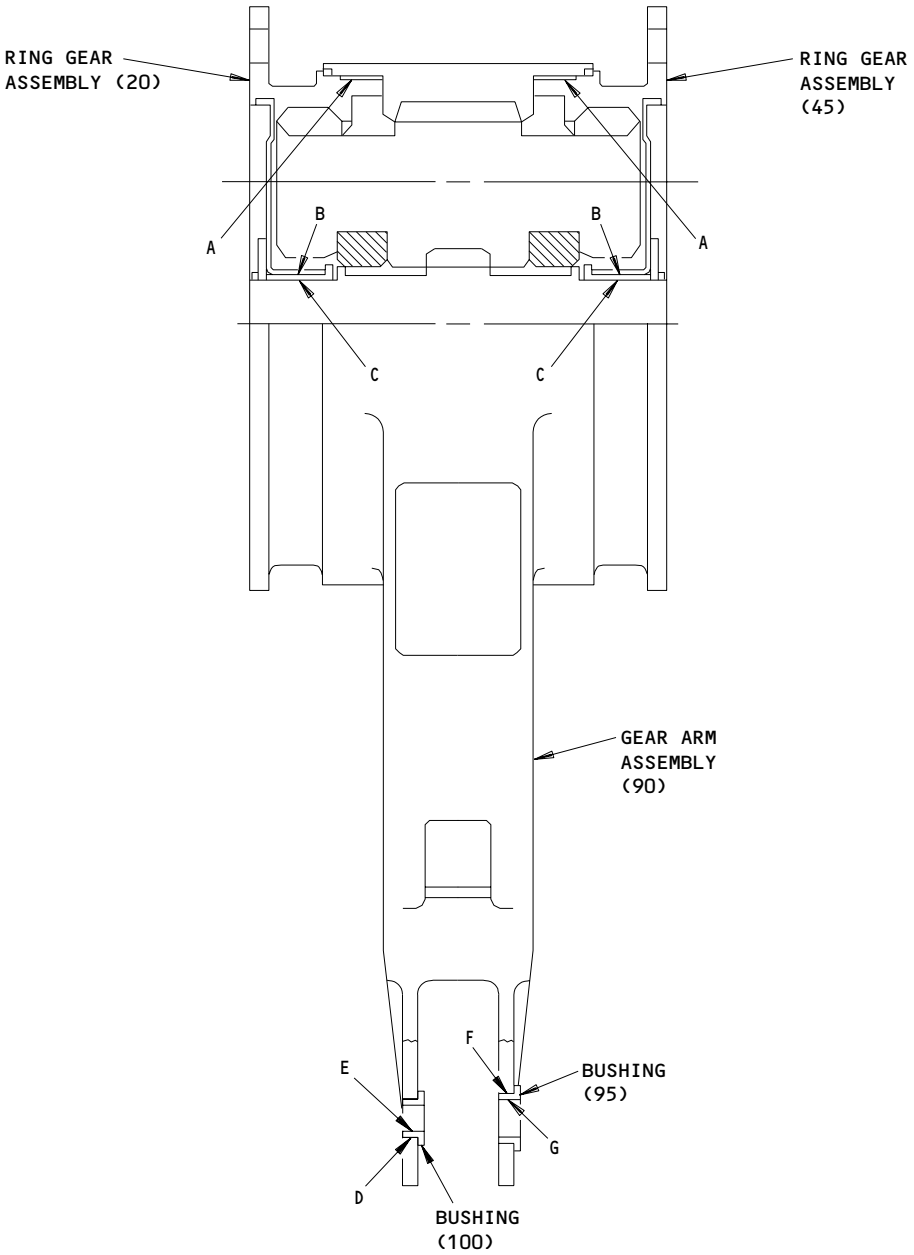
1 OFFSET HOLES ARE AT DIFFERENT RADIUS THAN OTHERS. OFFSET HOLES IN TWO RING GEARS (30,55) MUST BE IN LINE.

2 WITH OFFSET HOLES OPPOSITE TO GEAR ARM, DRAIN HOLES AND LOWER STOP MUST BE ON SAME SIDE AS SHOWN.

3 INSTALL WASHERS (10) AS REQUIRED TO OBTAIN INDICATED WIDTH. CHECK DIMENSION WITH FLANGES PULLED APART. MINIMUM OF ONE WASHER EACH END.

4 OPEN END OF OMNISEAL MUST FACE INWARD.

Assembly Details
Figure 701 (Sheet 2)



Fits and Clearances
Figure 801 (Sheet 1)

Ref Letter Fig.801	Mating Item No. IPL Fig.1	Design Dimension				Service Wear Limit		
		Dimension		Assembly Clearance *[1]		Dimension		Maximum Clearance
		Min	Max	Min	Max	Min	Max	
A	ID 92 OD 30,55	5.0805 5.0775	5.0820 5.0785	0.0020	0.0045			
B	ID 25,50 OD 70	1.249 1.253	1.251 1.255	-0.006	-0.002			
C	ID 70 OD 80	1.133 1.123	1.135 1.125	0.008	0.012			
D	ID 105 OD 100	0.5625 0.5636	0.5631 0.5642	-0.0017	-0.0005			
E	ID 100 OD *[3]	0.4375 0.4360	0.4385 0.4370	0.0005	0.0025	0.4335	0.4420	0.0050
F	ID 105 OD 95	0.7500 0.7512	0.7507 0.7519	-0.0019	-0.0005			
G	ID 95 OD *[2]	0.6245 0.6235	0.6255 0.6240	0.0005	0.0020	0.6205	0.6290	0.0050

ALL DIMENSIONS ARE IN INCHES

*[1] NEGATIVE VALUES DENOTE INTERFERENCE FIT
*[2] INSTALLATION PART BACB28AK07-031
*[3] INSTALLATION PART BACB30LT7-18

Fits and Clearances
Figure 801 (Sheet 2)

59667

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

NOTE: Equivalent substitutes may be used.

1. A27070-65 -- Assembly Equipment (replaces A27070-61, which can still be used with this component)

2. A27070-80 -- Bearing Installation Equipment

3. Dial Indicator

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 diferences (except left- and right-hand parts), product improvement parts, and parts added between two sequential item numbers. The alpha-variant is not shown on illustrations when appearance and location of all variants of the part is the same.

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

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

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

6. Parts Interchangeability

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

VENDORS

05939 FURON CO MECHANICAL SEAL DIV
4412 CORPORATE CENTER DRIVE PO BOX 520
LOS ALAMITOS, CALIFORNIA 90720-2410

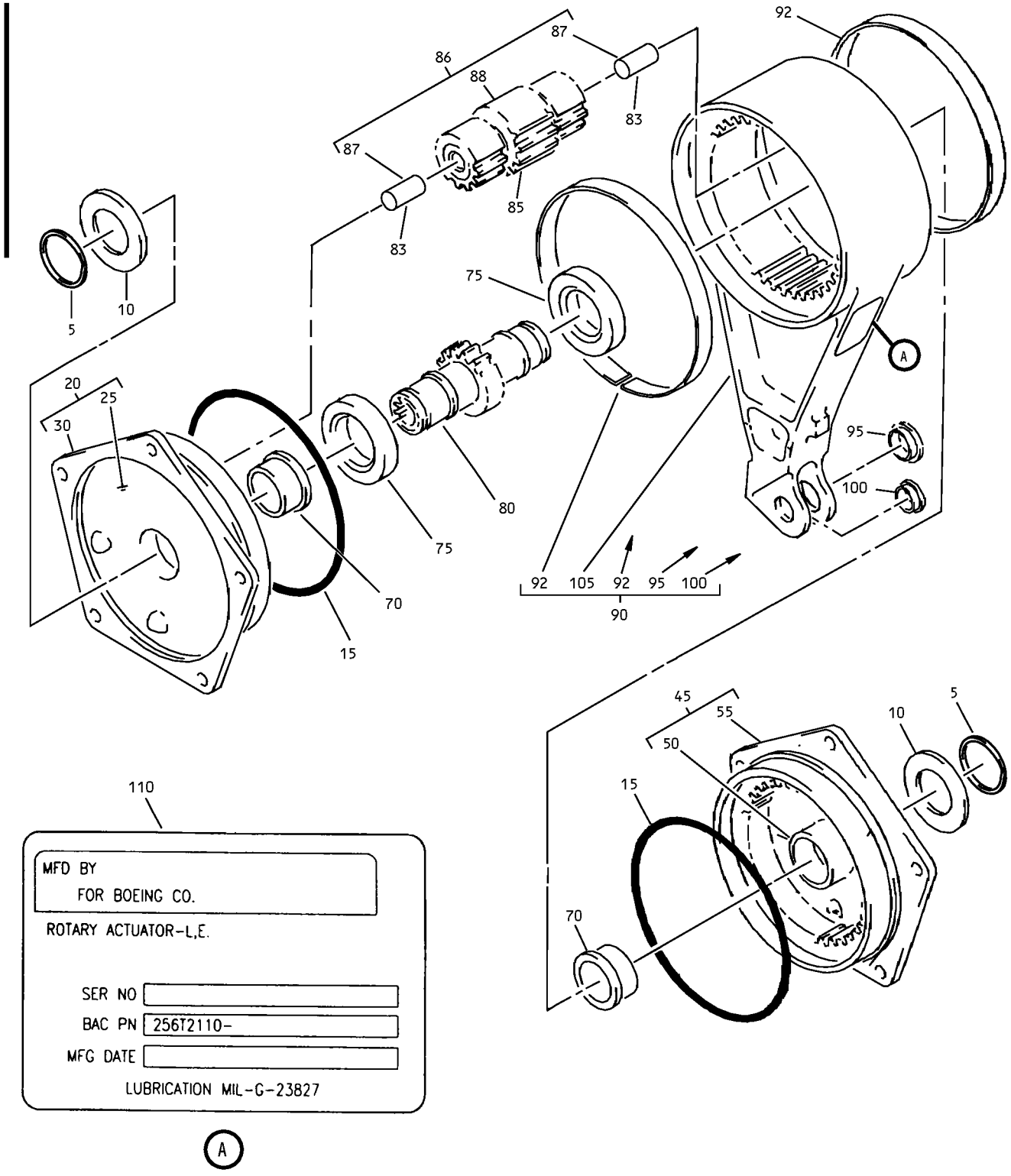
07322 MINNESOTA RUBBER COMPANY
3630 WOODDALE AVENUE PO BOX 1236
MINNEAPOLIS, MINNESOTA 55440-3069

80756 SPIROLUX DIV OF KAYDON CORP
29 CASSENS STREET
ST. LOUIS, MISSOURI 63026-2542

86917 VWR SCIENTIFIC INC
335 TRECK DRIVE PO BOX 3551 TERMINAL ANNEX
SEATTLE, WASHINGTON 98124

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
AR145322		1	15A	2
BACB28AM10B015A		1	95	1
BACB28AP07P014		1	100	1
Q4048-366Y		1	15	2
RS112C		1	5	2
23420-210		1	83	10
		1	87	10
256T2110-2		1	1	RF
256T2110-3		1	1A	RF
256T2110-4		1	1B	RF
256T2110-5		1	86B	5
256T2110-6		1	86C	5
256T2111-1		1	90	1
256T2111-2		1	90A	1
256T2111-3		1	105	1
256T2111-4		1	105A	1
256T2111-5		1	90B	1
256T2111-6		1	105B	1
256T2111-7		1	90C	1
256T2111-8		1	105C	1
256T2112-1		1	20	1
256T2112-2		1	45	1
256T2112-3		1	30	1
		1	55	1
256T2112-4		1	20A	1
256T2112-5		1	45A	1
256T2112-6		1	30A	1
		1	55A	1
256T2113-1		1	85	5
		1	85B	5
		1	88A	5
256T2113-2		1	85A	5
		1	88	5
256T2113-3		1	86	5
		1	86A	5
256T2114-1		1	80	1
256T2114-2		1	80A	1
256T2114-3		1	80B	1
256T2115-1		1	75	2
		1	75B	2

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
256T2115-2		1	75A	2
256T2116-1		1	25	1
256T2116-2		1	25A	1
256T2117-1		1	50	1
256T2117-2		1	50A	1
256T2119-1		1	70	2
256T2123-1		1	110	1
		1	110B	1
256T2124-1		1	92	2
256T2126-1		1	10	2
256T2127-1		1	100A	1
256T2127-2		1	100B	1
256T2127-3		1	100C	1
256T2127-4		1	100D	1
256T2127-5		1	100E	1
256T2127-6		1	100F	1
256T2128-1		1	95A	1
256T2128-2		1	95B	1
256T2128-3		1	95C	1
256T2128-4		1	95D	1
256T2128-5		1	95E	1
256T2128-6		1	95F	1
256T2277-2		1	110A	2



Inboard Leading Edge Slat Drive Rotary Actuator Assembly
Figure 1

T647888

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1	256T2110-2		ACTUATOR ASSY-INBD LE SLAT DRIVE ROTARY (PRE SB 27-0068R1)	A	RF
-1A	256T2110-3		ACTUATOR ASSY-INBD LE SLAT DRIVE ROTARY (POST SB 27-0068R1)	B	RF
-1B	256T2110-4		ACTUATOR ASSY-INBD LE SLAT DRIVE ROTARY	C	RF
5	RS112C		.RING-RETAINING (V80756)	A-C	2
10	256T2126-1		.WASHER	A-C	AR
15	Q4048-366Y		.SEAL-QUAD X (V07322)	A	2
-15A	AR145322		.SEAL-OMNI (V05939)	B,C	2
20	256T2112-1		.GEAR ASSY-RING END	A	1
-20A	256T2112-4		.GEAR ASSY-RING END	B,C	1
25	256T2116-1		..COVER-END	A	1
-25A	256T2116-2		..COVER-END	B,C	1
30	256T2112-3		..GEAR-RING	A	1
-30A	256T2112-6		..GEAR-RING	B,C	1
45	256T2112-2		.GEAR ASSY-RING END	A	1
-45A	256T2112-5		.GEAR ASSY-RING END	B,C	1
50	256T2117-1		..COVER-END	A	1
-50A	256T2117-2		..COVER-END	B,C	1
55	256T2112-3		..GEAR-RING	A	1
-55A	256T2112-6		..GEAR-RING	B,C	1
70	256T2119-1		.BEARING-FLANGED	A-C	2
75	256T2115-1		.RING-PLANET (OPT ITEM 75A)	B,C	2
-75A	256T2115-2		.RING-PLANET (OPT ITEM 75)	B,C	2
-75B	256T2115-1		.RING-PLANET	A	2

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
80	256T2114-1		.GEAR-SUN	A	1
-80A	256T2114-2		.GEAR-SUN	B	1
-80B	256T2114-3		.GEAR-SUN	C	1
83	23420-210		.PLUG-CORK *[1] (V86917) (ITEM 85B PLUS ITEM 83 (QTY 2) OPT ITEM 85A PLUS ITEM 83 (QTY 2) OPT ITEM 86)	B	10
85	256T2113-1		.GEAR-PLANET	A	5
-85A	256T2113-2		.GEAR-PLANET (ITEM 85B PLUS ITEM 83 (QTY 2) OPT ITEM 85A PLUS ITEM 83 (QTY 2) OPT ITEM 86)	B	5
-85B	256T2113-1		.GEAR-PLANET (ITEM 85B PLUS ITEM 83 (QTY 2) OPT ITEM 85A PLUS ITEM 83 (QTY 2) OPT ITEM 86)	B	5
-86	256T2113-3		.GEAR ASSY-PLANET (ITEM 85B PLUS ITEM 83 (QTY 2) OPT ITEM 85A PLUS ITEM 83 (QTY 2) OPT ITEM 86)	B	5
-86A	256T2113-3		.GEAR ASSY-PLANET (OPT ITEMS 86B,86C)	C	5
-86B	256T2110-5		.KIT ASSY-SUBSTITUTE (OPT ITEMS 86A,86C)	C	5
-86C	256T2110-6		.KIT ASSY-SUBSTITUTE (OPT ITEMS 86A,86B)	C	5
-87	23420-210		..PLUG-CORK *[1] (V86917)	B,C	2
-88	256T2113-2		..GEAR-PLANET (USED ON ITEMS 86,86A, 86C)	B,C	1
-88A	256T2113-1		..GEAR-PLANET (USED ON ITEM 86B)	C	1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
90	256T2111-1		.ARM ASSY-GEAR (OPT ITEM 90A,90B)	A	1
-90A	256T2111-2		.ARM ASSY-GEAR (OPT ITEM 90,90B)	A	1
-90B	256T2111-5		.ARM ASSY-GEAR (OPT ITEM 90,90A)	A	1
-90C	256T2111-7		.ARM ASSY-GEAR	B,C	1
92	256T2124-1		..BEARING-DU	A-C	2
-92A	256T2124-2		DELETED		
95	BACB28AM10B015A		..BUSHING-FLANGED	A-C	1
-95A	256T2128-1		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-95B	256T2128-2		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-95C	256T2128-3		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-95D	256T2128-4		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-95E	256T2128-5		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-95F	256T2128-6		..BUSHING-FLANGED (OVERSIZE)	A-C	1
100	BACB28AP07P014		..BUSHING-FLANGED	A-C	1
-100A	256T2127-1		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-100B	256T2127-2		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-100C	256T2127-3		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-100D	256T2127-4		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-100E	256T2127-5		..BUSHING-FLANGED (OVERSIZE)	A-C	1
-100F	256T2127-6		..BUSHING-FLANGED (OVERSIZE)	A-C	1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
105	256T2111-3		..ARM-GEAR (USED ON ITEM 90)	A	1
-105A	256T2111-4		..ARM-GEAR (USED ON ITEM 90A)	A	1
-105B	256T2111-6		..ARM-GEAR (USED ON ITEM 90B)	A	1
-105C	256T2111-8		..ARM-GEAR	B,C	1
110	256T2123-1		.NAMEPLATE (OPT ITEM 110A)	A,B	1
-110A	256T2277-2		.NAMEPLATE (OPT ITEM 110)	A,B	1
-110B	256T2123-1		.NAMEPLATE	C	1

- Item Not Illustrated

*[1] OMIT CORK PLUG TO REDUCE RISK OF CORROSION.