COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

TE FLAP DRIVE, NO. 3 AND 6 TRANSMISSION ASSEMBLY

PART NUMBER 65C27503–1, –2, –3, 65C27506–1, –2, –3

PUBLISHED BY BOEING COMMERCIAL AIRPLANES GROUP, SEATTLE, WASHINGTON, USA
A DIVISION OF THE BOEING COMPANY
PAGE DATE: Jul 01/2009

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COMPONENT MAINTENANCE MANUAL

Revision No. 25
Jul 01/2009

To: All holders of TE FLAP DRIVE, NO. 3 AND 6 TRANSMISSION ASSEMBLY 27-55-61.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

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

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

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

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Location of Change	Description of Change
27-55-61 SPECIAL TOOLS FIXTURES AND EQUIPMENT	Changed the data in the Tool Supplier Information table. Added the Commercial Tools table. Added the Special Tools table. Added the Tool Supplier Information table.

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TABLE OF CONTENTS

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR 33310-1	JUN 05/84
		PRR 33451	JUN 05/84
		PRR 34103-1	SEP 05/87

All revisions to this manual will be accompanied by transmittal sheet bearing the revision number. Enter the revision number in numerical order, together with the revision date, the date filed and the initials of the person filing.

Revision		Filed		Revision		Filed	
Number	Date	Date	Initials	Number	Date	Date	Initials

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Temporary Revision		Inserted		Removed	
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INTRODUCTION

1. General

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

B. This manual is divided into different parts:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) List of Effective Pages

(5) Table of Contents

(6) Temporary Revision & Service Bulletin Record

(7) Record of Revisions

(8) Record of Temporary Revisions

(9) Introduction

(10) Procedures & IPL Sections

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

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

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

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

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

TRAILING EDGE FLAP DRIVE SYSTEM NOS. 3 AND 6 TRANSMISSION ASSEMBLIES - DESCRIPTION AND OPERATION

1. Description and Operation

A. The trailing edge flap drive system No. 3 and 6 transmission assemblies each consist of four bevel gears, a torque brake assembly, and an output shaft enclosed in a sealed, lubricant-filled housing. Splined couplings connect to the flap drive torque tube system at two locations. A universal joint assembly at the end of the output shaft attaches to the flap ballscrew actuator.

B. Each transmission assembly transmits flap drive torque to a ballscrew and nut assembly, and also transmits torque through to the No. 2 or 7 transmission assembly. The torque brake limits the torque applied to the ballscrew. The assemblies are located at the outboard ends of the inboard flaps.

2. Leading Particulars (Approximate)

A. Length – 16 inches

B. Width – 17 inches

C. Height – 11 inches

D. Weight – 35 pounds

TESTING AND FAULT ISOLATION

1. General

A. This procedure has the data necessary to do a test of the trailing edge flap drive system No. 3 and 6 transmission assemblies after an overhaul or for fault isolation.

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

C. Refer to IPL Figure 1 for item numbers.

2. Testing

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-5446	X-Y recorder (Part #: RW20IT, Supplier: 31991) (Opt Part #: 7046A, Supplier: 28480) (Opt Part #: 7090A, Supplier: 28480)
SPL-5448	Strain gage conditioner (Part #: 3170, Supplier: 02654)
SPL-5449	Strain gage conditioner (Part #: 3270, Supplier: 02654)
SPL-5464	Transmission tester (Part #: ST6396, Supplier: 71791)

B. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00070	Fluid - Hydraulic, Petroleum Base	MIL-PRF-5606 (Replaces MIL-H-5606)
G01048	Lockwire - Corrosion Resistant Steel (0.032 In. Dia.)	NASM20995˜ C32

C. References

Reference	Title
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES

D. Preparation for Test

(1) Ensure that test unit has been serviced with hydraulic fluid fluid, D00070 per ASSEMBLY, Paragraph 3.D.(14).

E. Functional Test (IPL Figure 1)

NOTE: Conduct tests at room temperature.

(1) Rotate input coupling (400) in each direction by hand. Check that gears and bearings are free running with no evidence of binding at any position.

(2) Remove plug (10) and install air valve adapter in upper filler port. Connect air supply and pressurize at 14.5-15.5 psi for minimum of 3 minutes (non-operating). Check that there is no evidence of leakage.

(3) Remove adapter and install plug with new packing (15). Lockwire plug with lockwire, G01048 per SOPM 20-50-02, double-twist method.

(4) Rotate input bevel gear (470) 10 revolutions in each direction. Allow unit to stand for 8 hours. Check that there is no evidence of leakage.

(5) With output shaft (90) and output bevel gear (385) free to rotate, check that torque required to rotate input shaft does not exceed 12 lb-in. in either direction.

(6) Lock output shaft. Apply 45-55 lb-in. clockwise torque to input shaft and mark shaft position. Apply equivalent counterclockwise torque and check that input backlash does not exceed 20 degrees.

CAUTION: DO NOT EXCEED 1480 LB-IN. INPUT TORQUE OR DAMAGE TO UNIT MAY OCCUR.

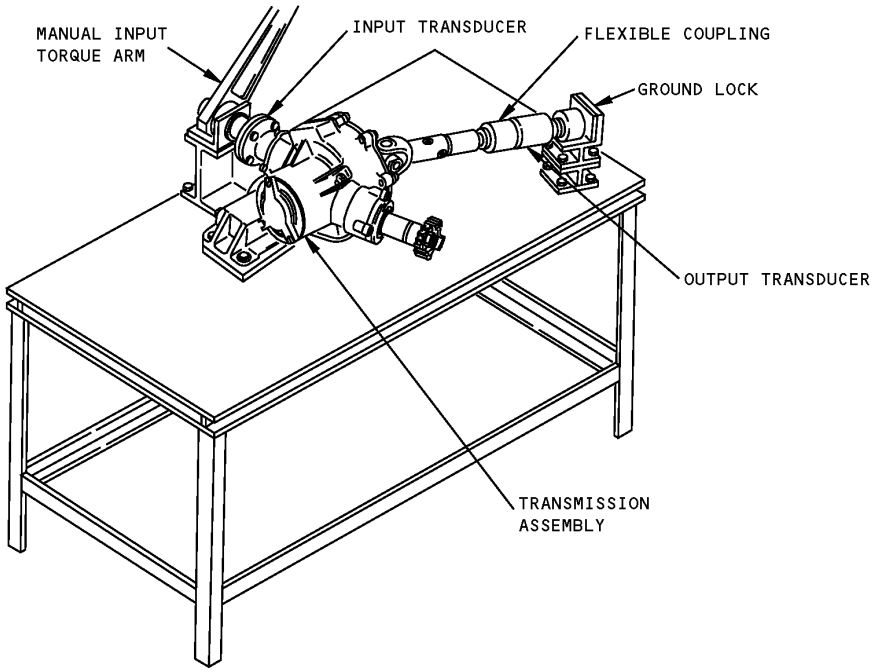
(7) Mount assembly in transmission tester, SPL-5464 (TESTING AND FAULT ISOLATION, Figure 101). Connect input and output torque transducers and Strain gage conditioner, SPL-5448 or Strain gage conditioner, SPL-5449 to the X-Y recorder, SPL-5446 and zero recorder.

NOTE: X-Y recorder, Model 6423 DIN A3 is optonal to the HP7090A. (Soltec Corp., Sol Vista Park, 12977 Arroyo St., San Fernando, CA 91340-5197)

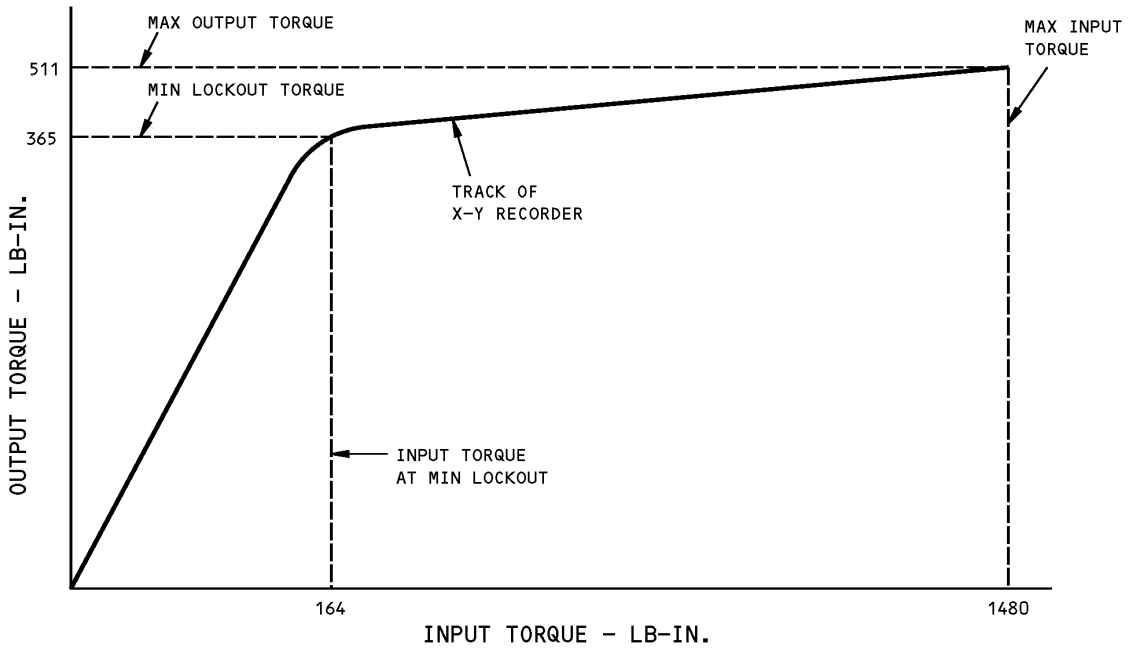
(8) Install manual input torque arm (TESTING AND FAULT ISOLATION, Figure 101) and apply slowly increasing clockwise torque to unit. Check that output torque at minimum lockout is not less than 365 lb-in. for input torque of 164 lb-in. Check that output torque does not exceed 511 lb-in. at 1480 lb-in. input torque (TESTING AND FAULT ISOLATION, Figure 102).

(9) Repeat TESTING AND FAULT ISOLATION, Paragraph 2.E.(8) except in counterclockwise direction.

(10) Remove unit from transmission tester, SPL-5464 and ink stamp "FT" followed by date of test completion on gear housing (475, 480) adjacent to identification nameplate (505).



Functional Test Setup
Figure 101



Torque Brake Lockout Limits
Figure 102

3. **Troubleshooting**

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

Table 101: Trouble Shooting Chart

TROUBLE	PROBABLE CAUSE	CORRECTION
Binding or roughness	Defective bearings (130,145, 205,295,370,380,455,465), gears (165,175,190,200,385, 470), or torque brake (230)	Replace parts as required.
	Improper shimming	Correct shimming per ASSEMBLY.
External leakage	Defective packings (35,115, 345,360,430,445) or seals (135,220,335,420)	Replace parts as required.
Backlash out of range	Improper shimming or worn components	Correct shimming per ASSEMBLY or replace gears.
Lockout out of range	Defective torque brake assembly (230)	Repair or replace torque brake.

DISASSEMBLY

1. General

A. This procedure has the data necessary to disassemble the trailing edge flap drive system No. 3 and 6 transmission assemblies.

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

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

D. Refer to IPL Figure 1 for item numbers.

2. Disassembly (IPL Figure 1)

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-5415	Splined Coupling Spanner Wrench (Part #: F71228-500, Supplier: 81205)
SPL-5462	Adapter - Torque Wrench (Part #: ST6105-3, Supplier: 71791)
SPL-5463	Spring Expansion Fixture (Part #: ST6107, Supplier: 71791)

B. Parts Replacement

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

(1) Packings (35, 115, 345, 360, 430, 445)

(2) Washer (45)

(3) Retaining ring (140)

(4) Seals (135, 220, 335, 420)

C. Procedure (IPL Figure 1)

(1) Remove all lockwire.

(2) Remove plugs (10) and packings (15). Drain hydraulic fluid from assembly.

(3) Remove bolts (20) and washers (25) and separate cover (30) from housing assembly (475 or 480). Remove packing (35) from cover.

(4) Remove and disassemble universal-joint assembly (55).

(a) Straighten tangs of washer (45). Use torque wrench adapter, SPL-5462 to loosen nut (40), then remove parts (40 thru 50) from end of output shaft (90).

(b) Tap end of output shaft and remove universal-joint assembly from housing assembly (475 or 480).

(c) Remove parts (60 thru 70) from universal-joint assembly, then separate yoke (75), pin (80), cross (85) and output shaft (90).

NOTE: Do not remove bushings (95) from yoke or shaft unless necessary for repair or replacement.

(5) Remove ring gears

(a) Remove bolts (100), washers (105), and cover (110) from housing assembly (475). Remove parts (115 thru 135) from cover. Note thickness of shim (120) to facilitate reassembly.

(b) Pull assembled ring gears and associated parts (140, 150 thru 205, 235) from housing assembly. Remove retaining ring (140) and separate coupling (235) from assembled parts.

NOTE: Coupling (235) is part of torque brake assembly (230).

(c) Remove bearings (145, 205).

(d) Remove nuts (150), washers (155) and bolts (160 or 180), and separate parts (165 thru 175 or 185 thru 200). Note thickness of shim (170 or 195) to facilitate reassembly.

(6) Remove and disassemble torque brake assembly (230).

(a) Remove parts (210 thru 225) and separate torque brake assembly and housing assembly (475 or 480).

(b) Remove adapter (290) and bearing (295) from housing (475 or 480). Remove shim (300) and note thickness to facilitate reassembly.

(c) Remove supports (240, 245) from torque brake housing (285).

(d) Support torque brake housing while providing clearance for internal parts. Apply pressure on sleeve (260) to press out spring pack assembly (250) from housing. Remove rings (255). Remove shims (270), if installed. Note number, thickness, and location of shims to facilitate reassembly.

NOTE: Up to two shims may be installed at each end of spring pack assembly.

(e) Disassemble spring pack assembly (250)

1) Install spring pack assembly in Spring Expansion Fixture, SPL-5463.

2) Align spring turns with fixture spring stops, tapping with a soft drift, as required. Move stops inward to position them for spring engagement and lock in place.

CAUTION: SPRING SET (280) IS A MATCHED ASSEMBLY. DO NOT REPLACE OR REWORK SPRINGS INDIVIDUALLY OR UNIT MAY NOT FUNCTION PROPERLY.

3) Rotate drive shaft until stops contact ends of spring set (280). Continue to wind springs until adapter (275) is free. Remove adapter and sleeves (260, 265) from spring set.

4) Rotate drive shaft in reverse to unwind spring until fixture stops are free of spring ends. Loosen all four spring stops and move outward then remove spring set from fixture. Tag springs to identify as a matched pair.

(7) Remove input bevel gear (470).

(a) Hold coupling (400) with F71228-500 Splined Coupling Spanner Wrench, SPL-5415 and loosen nut (390). Remove parts (390 thru 400).

(b) Remove bevel gear (470) and bearing (465) through large opening in housing assembly (475 or 480).

(c) Remove bolts (405) and washers (410), then remove parts (415 thru 460) from housing assembly. Remove packings (430, 445) from sleeve (425) and housing.

(d) Remove shim (440) from retainer (435). Remove retaining ring (460) from inside retainer, then remove bearing (455) and shim (450). Note thickness of shims (440, 450) to facilitate reassembly.

(8) Remove output bevel gear (385).

(a) Hold coupling (315) with wrench F71228-500 Splined Coupling Spanner Wrench, SPL-5415 and loosen nut (305). Remove parts (305 thru 315).

(b) Remove bevel gear (385) and bearing (380) through large opening in housing assembly (475 or 480).

(c) Remove bolts (320) and washers (325), then remove parts (330 thru 375) from housing assembly. Remove packings (345, 360) from sleeve (340) and housing.

(d) Remove shim (355) from retainer (350). Remove retaining ring (375) from inside retainer, then remove bearing (370) and shim (365). Note thickness of shims (355, 365) to facilitate reassembly.

NOTE: Do not remove nameplate (505), bushings (495), or inserts (500) from housing assembly unless necessary for repair or replacement.

CLEANING

1. General

A. This procedure has the data necessary to clean the trailing edge flap drive system No. 3 and 6 transmission assemblies.

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

C. Refer to IPL Figure 1 for item numbers.

2. Cleaning

A. References

Reference	Title
SOPM 20-30-03	GENERAL CLEANING PROCEDURES

B. Procedure

(1) Clean all parts except bearings using standard industry practices (SOPM 20-30-03).

(2) Clean teflon sealed bearings (130, 145, 205, 295, 370, 380, 455, 465, IPL Figure 1) per manufacturer's instructions.

CHECK

1. General

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

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

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

D. Refer to IPL Figure 1 for item numbers.

2. Check

A. References

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

B. Procedure

(1) Do a magnetic particle check (IPL Figure 1) (SOPM 20-20-01) of these parts:

(a) Universal joint assembly: bolt (65), spacer (70), yoke (75), pin (80), cross (85), shaft (90)

(b) Nut (40), adapter (290)

(c) Torque brake assembly: ring (255), adapter (275), sleeve (260, 265), spring set (280), housing (285), coupling (235), support (240, 245)

(d) Gear (165, 175, 190, 200, 385, 470)

(e) Coupling (315, 400)

(f) Sleeve (340, 425)

(g) Washer (50, 310, 395)

(h) Driver (185)

(2) Do a penetrant check (IPL Figure 1) (SOPM 20-20-02)) of these parts:

(a) Housing (485, 490)

(b) Retainer (330, 415)

(c) Cover (30, 110)

(3) Check gear teeth and splines for uneven wear.

REPAIR

1. Content

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

Table 601:

PART NUMBER	NAME	REPAIR
65-50266	COVER	1-1
65-50309	HOUSING, GEAR	2-1
65-76603	UNIVERSAL JOINT	3-1
65-76607	BOLT	4-1
69-52407	SHAFT, OUTPUT	5-1
69-52412	GEAR, BEVEL	6-1
69-52417	GEAR, BEVEL	7-1
69-52420	YOKE	8-1
69-52469	RETAINER	9-1
69-52473	SLEEVE	10-1
69-52474	SLEEVE	11-1
69-60053	SPACER	12-1
69-60057	PIN, CROSS	13-1
69-60059	CROSS, TRUNNION	14-1
176667-2	BRAKE, TORQUE	15-1
69-52461	NAMEPLATE	16-1
—	MISC PARTS REFINISH	17-1

2. Standard Practices

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

- SOPM 20-10-01 Repair and Refinish of High Strength Steel Parts
- SOPM 20-10-02 Machining of Alloy Steel
- SOPM 20-10-03 Shot Peening
- SOPM 20-10-04 Grinding of Chrome Plated Parts
- SOPM 20-20-01 Magnetic Particle Inspection
- SOPM 20-30-02 Stripping of Protective Finishes
- SOPM 20-30-03 General Cleaning Procedures
- SOPM 20-41-01 Decoding Table for Boeing Finish Codes
- SOPM 20-41-02 Application of Chemical and Solvent Resistant Finishes
- SOPM 20-42-02 Low Hydrogen Embrittlement Cadmium-Titanium Alloy Plating
- SOPM 20-42-03 Hard Chrome Plating

- SOPM 20-42-09 Electrodeposited Nickel Plating
- SOPM 20-43-01 Chromic Acid Anodizing
- SOPM 20-44-01 Application of Special Purpose Coatings and Finishes
- SOPM 20-50-03 Bearing Installation and Retention
- SOPM 20-50-05 Application of Aluminum Foil and Other Markers
- SOPM 20-50-12 Application of Adhesives

3. Materials

NOTE: Equivalent substitutes may be used.

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

B. Enamel – coating, C00260 BMS 10-11, Type 2, BAC707 gray gloss

C. Enamel – coating, C00032 BMS 10-60, Type 1, Black

D. Enamel – coating, C50075 BMS 10-60, Type 2, BAC 707 gray gloss

E. Adhesive – adhesive, A50090 BMS 5-126

F. Topcoating – coating, B00571 Skydrol-resistant, Type 41, clear

4. Dimensioning Symbols

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

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

EXAMPLES

[— | 0.002]	STRAIGHT WITHIN 0.002
[⊥ | 0.002 | B]	PERPENDICULAR TO B WITHIN 0.002
[// | 0.002 | A]	PARALLEL TO A WITHIN 0.002
[○ | 0.002]	ROUND WITHIN 0.002
[⌭ | 0.010]	CYLINDRICAL SURFACE MUST LIE BETWEEN TWO CONCENTRIC CYLINDERS, ONE OF WHICH HAS A RADIUS 0.010 INCH GREATER THAN THE OTHER
[⌒ | 0.006 | A]	EACH LINE ELEMENT OF THE SURFACE AT ANY CROSS SECTION MUST LIE BETWEEN TWO PROFILE BOUNDARIES 0.006 INCH APART RELATIVE TO DATUM PLANE A
[⌓ | 0.020 | A]	SURFACES MUST LIE WITHIN PARALLEL BOUNDARIES 0.02 INCH APART AND EQUALLY DISPOSED ABOUT TRUE PROFILE
[◎ | Ø 0.0005 | C]	CONCENTRIC TO C WITHIN 0.0005 DIAMETER
[⌯ | 0.010 | A]	SYMMETRICAL WITH A WITHIN 0.010
[∠ | 0.005 | A]	ANGULAR TOLERANCE 0.005 WITH A
[⌖ | Ø 0.002 Ⓢ | B]	LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE
[⊥ | Ø 0.010 Ⓜ | A] [0.510 Ⓟ]	AXIS IS TOTALLY WITHIN A CYLINDER OF 0.010-INCH DIAMETER, PERPENDICULAR TO, AND EXTENDING 0.510-INCH ABOVE, DATUM A, MAXIMUM MATERIAL CONDITION
[2.000] OR 2.000 BSC	THEORETICALLY EXACT DIMENSION IS 2.000

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

True Position Dimensioning Symbols
Figure 601

BEVEL GEAR COVER - REPAIR 1-1

65-50266–2

1. General

A. This procedure has the data necessary to refinish the bevel gear cover (110, IPL Figure 1).

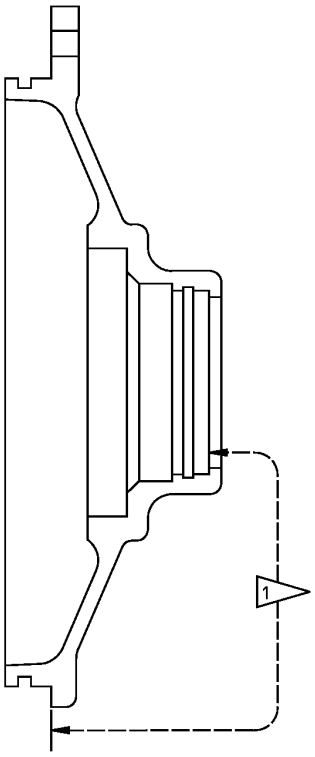
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

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

D. Refer to IPL Figure 1 for item numbers.

2. Plating Repair

A. Repair consists of stripping and restoration of original finish. Refer to Refinish instruction in REPAIR 1-1, Figure 601.



REFINISH

CHROMIC ACID OR SULFURIC ACID ANODIZE (F-17.05) ALL OVER. APPLY ONE LAYER OF PRIMER, BMS 10-11, TYPE 1 (F-20.02) AS NOTED

1 APPLY PRIMER THESE SURFACES ONLY

MATERIAL: AL ALLOY

Bevel Gear Cover Refinish
Figure 601

GEAR HOUSING ASSEMBLY - REPAIR 2-1

65-50309–7, –8

1. General

A. This procedure has the data necessary to refinish the gear housing assembly (475, IPL Figure 1).

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

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

D. Refer to IPL Figure 1 for item numbers.

2. Bushing Replacement

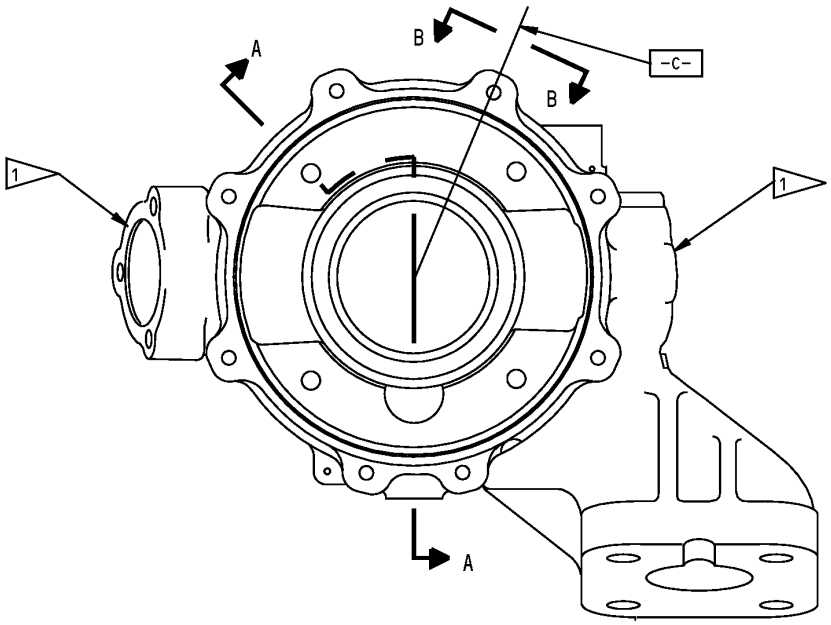
A. Procedure (IPL Figure 1)

(1) Remove bushing (495) from housing assembly (475, 480).

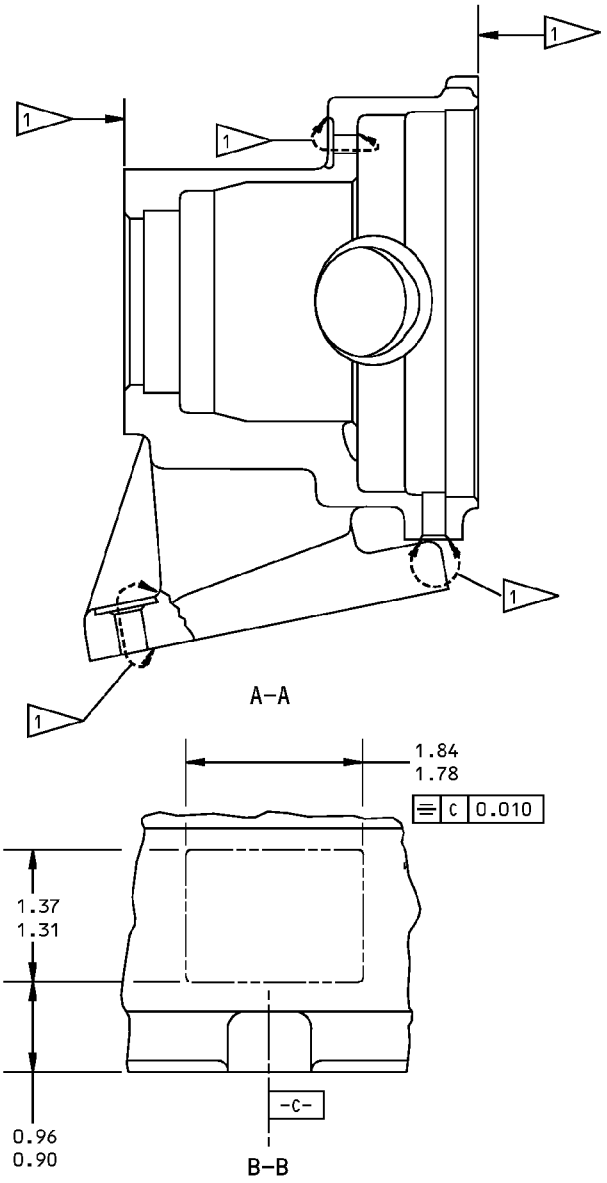
(2) Install replacement bushing with wet primer, C00259 (SOPM 20-50-03).

3. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 2-1, Figure 601.



Gear Housing Refinish
Figure 601 (Sheet 1 of 2)



REFINISH

CHROMIC ACID ANODIZE (F-17.02) ALL OVER. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (F-20.02) ON EXTERIOR SURFACES EXCEPT ON FACES AND HOLES AS NOTED

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

1 NO PRIMER ON THESE SURFACES

65-50309-7,-8

Gear Housing Refinish
Figure 601 (Sheet 2 of 2)

UNIVERSAL JOINT ASSEMBLY - REPAIR 3-1

65-76603–5

1. General

A. This procedure has the data necessary to refinish the universal joint assembly (55, IPL Figure 1).

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

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

D. Refer to IPL Figure 1 for item numbers.

E. For repair of assembly detail parts, refer to REPAIR 4-1, REPAIR 8-1, REPAIR 12-1, REPAIR 13-1, and REPAIR 14-1.

2. Bushing Replacement

A. If installed bushings (95, IPL Figure 1) meet CHECK requirements and are not worn beyond service limits specified in FITS AND CLEARANCES, bushings need not be replaced. Remove bushings, rotate 180 degrees, and reinstall per SOPM 20-50-03, using wet primer, C00259.

B. If bushings are damaged or worn beyond service wear limits, install new bushings in yoke (75) or output shaft (90) per SOPM 20-50-03, using wet primer, C00259.

NOTE: Replace bushings in pairs.

UNIVERSAL JOINT BOLT - REPAIR 4-1

65-76607–1

1. General

A. This procedure has the data necessary to refinish the universal joint assembly (55, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Bearing Surface Repair

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

(1) Machine diameter as required, within repair limit shown, to remove defects (SOPM 20-10-02.

(2) Stress relieve by heating to 500-550°F for 4 hours then air-cooling at 65-75°F. Magnetic particle check per (SOPM 20-20-01).

(3) Shot peen as indicated (SOPM 20-10-03).

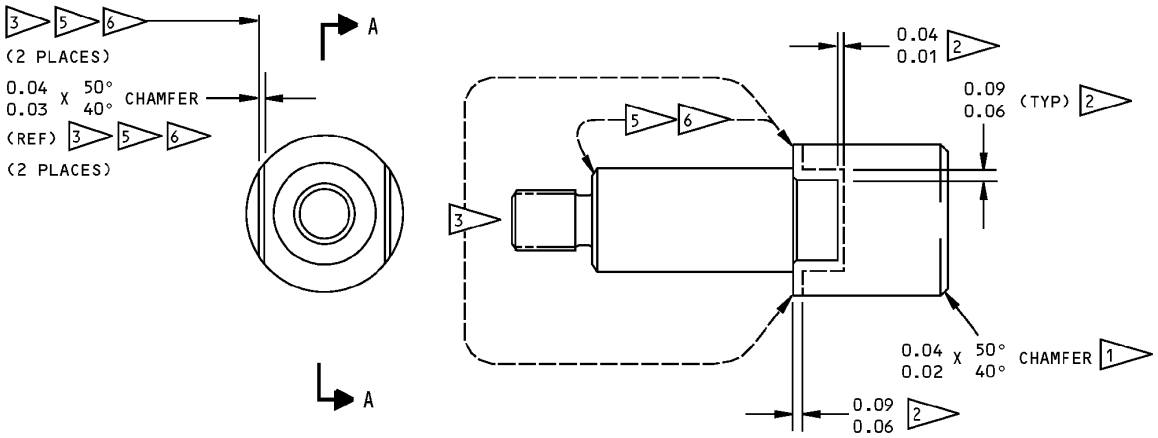
(4) Build up repaired area with chrome plate per (SOPM 20-42-03) and grind to design dimensions and finish shown (SOPM 20-10-04).

(5) Magnetic particle check per (SOPM 20-20-01).

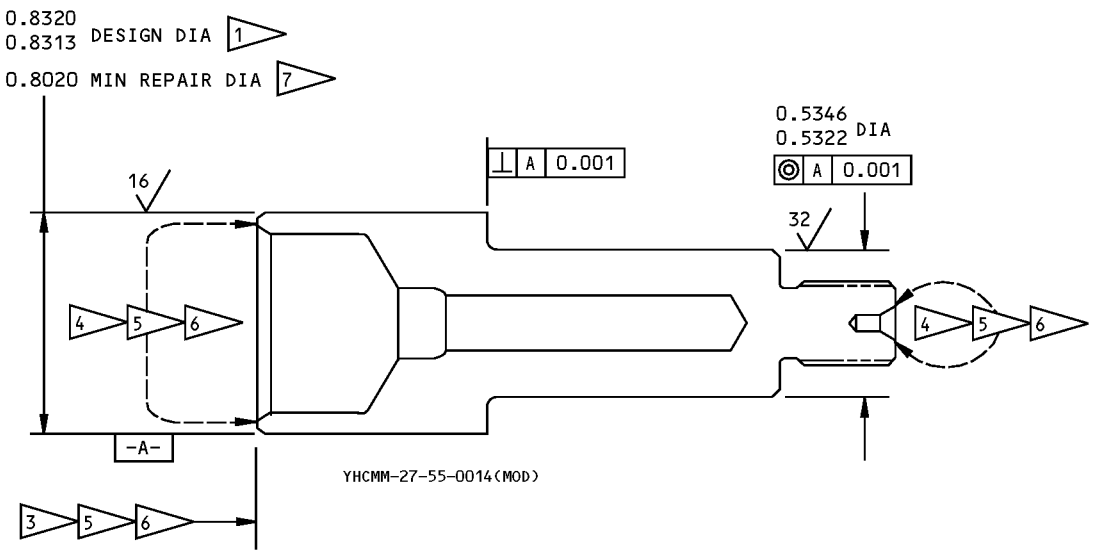
3. Refinish

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

(1) For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 4-1, Figure 601.



Universal Joint Bolt Repair
Figure 601 (Sheet 1 of 2)



A-A

REFINISH

CHROME PLATE PER 1 2. CADMIUM-TITANIUM PLATE ALL OTHER SURFACES PER 3 4. APPLY ONE COAT PRIMER PER 5 AND ONE COAT ENAMEL PER 6

1 CHROME PLATE (F-15.04) 0.003-0.005 THICK

2 CHROME PLATE RUNOUT. AREA NOT CHROME PLATED MUST BE PLATED AND PRIMED PER 3 AND 5

3 CADMIUM-TITANIUM ALLOY PLATE (F-1.18) 0.0003-0.0005 THICK

4 CADMIUM-TITANIUM PLATE THROW-IN PREFERRED

5 APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (SRF-12.205)

6 APPLY ONE COAT ENAMEL, BMS 10-11, TYPE 2 (SRF-12.63)

7 BUILD UP WITH CHROME PLATE AND GRIND TO DESIGN DIMENSIONS AND FINISH SHOWN. OBSERVE PLATING RUNOUT AS NOTED

REPAIR

REF 7

125 ALL MACHINED SURFACES EXCEPT AS NOTED

BREAK SHARP EDGES 0.010-0.030R

SHOT PEEN: 0.017-0.033 SHOT SIZE
0.015 A2 INTENSITY

MATERIAL: 4340M STEEL (275-300 KSI)

ALL DIMENSIONS ARE IN INCHES

65-76607-1

Universal Joint Bolt Repair
Figure 601 (Sheet 2 of 2)

OUTPUT SHAFT - REPAIR 5-1

69-52407–1, –2, –3

1. General

A. This procedure has the data necessary to refinish the output shaft (90, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Bearing Surface Repair

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

(1) Magnetic particle examine the surface as specified in SOPM 20-20-01.

(2) Machine diameter as required, within repair limit shown, to remove defects (SOPM 20-10-02).

(3) Stress relieve by heating to 900-950°F for 2 hours (69-52407-1), or to 500-550°F for 4 hours (69-52407-2,-3), then air-cooling at 65-75°F. Magnetic particle check per SOPM 20-20-01.

(4) Shot peen as indicated (SOPM 20-10-03).

(5) Build up repaired area with chrome plate (SOPM 20-42-03) and grind (SOPM 20-10-04) to design dimensions and finish shown.

(6) Magnetic particle check per SOPM 20-20-01.

(7) Refinish the shaft as shown.

3. Trunnion Hole Repair

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

(1) Magnetic particle examine the holes as specified in SOPM 20-20-01.

(2) Machine the holes as necessary, within the repair limit shown, to remove defects. Make sure to keep the hole perpendicularity and surface finish of 63 microinches as specified in REPAIR 5-1, Figure 601.

(3) Stress releive by heating to 900-950°F for 2 hours (69-52407-1), or to 500-550°F for 4 hours (69-52407-2, -3), then air-cool at 65-75°F.

(4) Magnetic particle examine the holes as specified in SOPM 20-20-01.

(5) Shot peen the machined area as specified in REPAIR 5-1, Figure 601.

(6) Chrome plate the repair area as specified in SOPM 20-42-03.

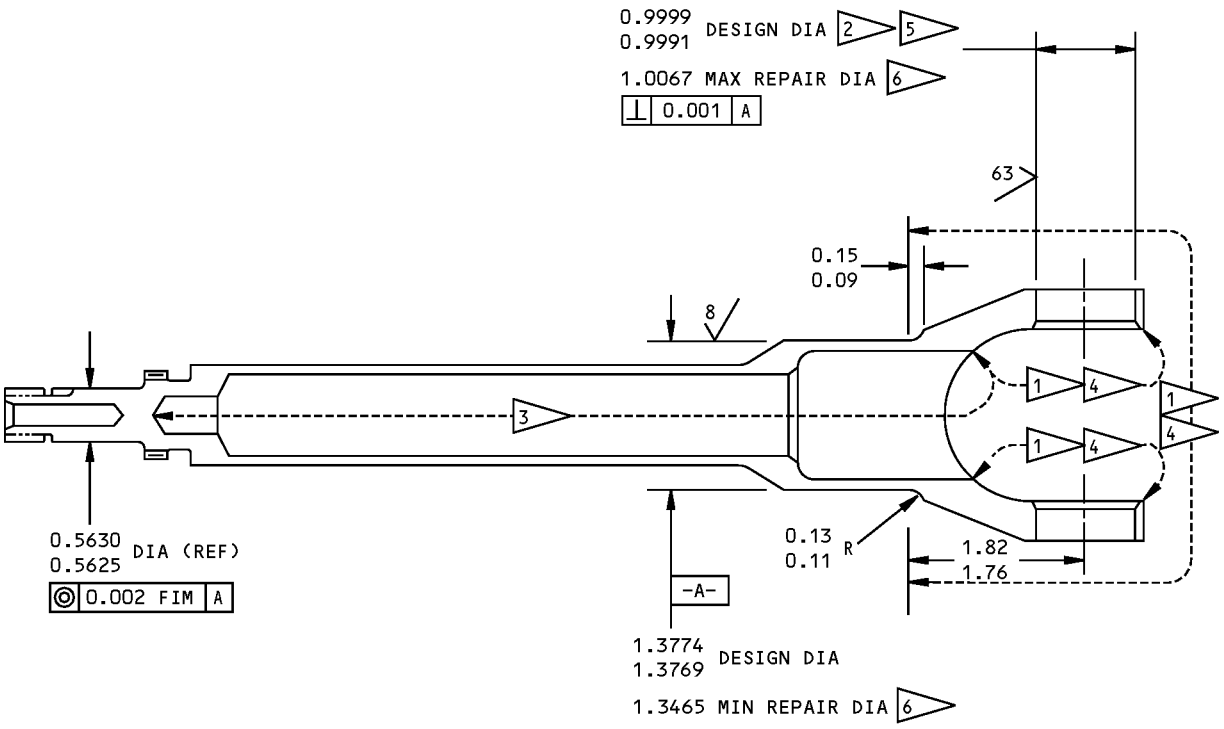
(7) Machine the holes to the deisgn diameter (0.9991-0.9999) and surface finish of at least 63 microinches. The chrome plate thickness must be at least 0.002 inch thick after the holes are machined.

(8) Magnetic particle examine the holes as specified in SOPM 20-20-01.

(9) Refinish the shaft as shown.

4. **Refinish**

   A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 5-1, Figure 601.



REFINISH

CADMIUM-TITANIUM ALLOY PLATE (F-15.01) AS SHOWN. APPLY BMS 10-11, TYPE 1 PRIMER AS SHOWN.

1. CADMIUM-TITANIUM PLATE (F-15.01) THESE SURFACES
2. CADMIUM-TITANIUM PLATE (F-15.01) TO A THICKNESS OF 0.0003-0.0005 IN THIS AREA
3. CADMIUM-TITANIUM PLATE (F-15.01) ON THESE SURFACES IS OPTIONAL. APPLY 2 COATS OF BMS 10-11, TYPE 1 PRIMER (F-20.03) TO THE SURFACES SHOWN.
4. APPLY 1 COAT OF BMS 10-11, TYPE 1 PRIMER (F-20.02) TO THE AREA SHOWN.
5. DO NOT PUT PRIMER ON THIS SURFACE.
6. BUILD UP WITH CHROME PLATE AND MACHINE TO THE DESIGN DIMENSIONS. FINISH AS SHOWN.

REPAIR

REF 6

BREAK SHARP EDGES 0.003-0.020 R

SHOT PEEN: 0.017-0.039 SHOT SIZE
0.016 A2 INTENSITY

MATERIAL: (69-52407-2,-3) 4340M STEEL (270-300 KSI)
(69-52407-1) MOD H-11 STEEL (RC 54-56)

ALL DIMENSIONS ARE IN INCHES

69-52407-1,-2,-3

Output Shaft Repair
Figure 601

BEVEL GEAR - REPAIR 6-1

69-52412–2, –3

1. General

A. This procedure has the data necessary to repair the bevel gear (470, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Bearing Surface Repair

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

CAUTION: GRINDING BEYOND SPECIFIED LIMIT IS NOT PERMITTED.

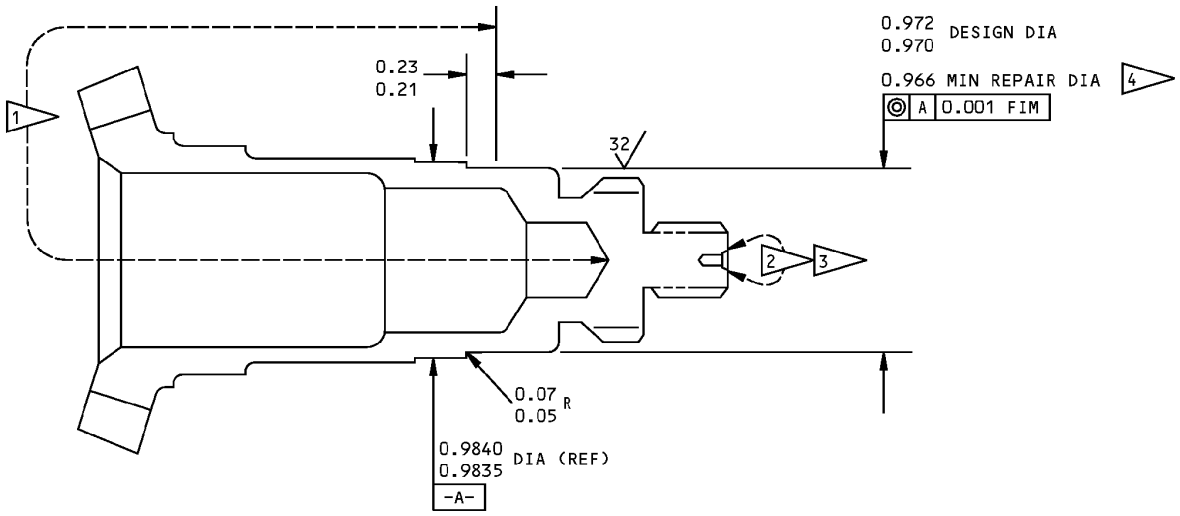
(1) Grind worn or damaged surface as required, within repair limit shown, to remove defects (SOPM 20-10-01).

(2) Stress relieve by heating to 900-950°F for 2 hours (69-52412-2) or to 500-550°F for 4 hours (69-52412-3) then air-cooling at 65-75°F.

(3) Magnetic particle check per SOPM 20-20-01.

3. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 6-1, Figure 601.



REFINISH

CADMIUM-TITANIUM ALLOY PLATE (F-15.01) 0.0005-0.0007 THICK EXCEPT AS NOTED. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (F-20.02) PLUS ONE COAT ENAMEL, BMS 10-11, TYPE 2 (SRF-12.63) AS NOTED

1. NO PLATING THIS AREA
2. PLATING OPTIONAL THESE SURFACES
3. APPLY PRIMER PLUS ENAMEL THESE SURFACES
4. GRIND WORN OD TO INDICATED FINISH. GRINDING BEYOND INDICATED LIMIT NOT PERMITTED

REPAIR

REF 4

BREAK SHARP EDGES 0.003-0.020

MATERIAL: (69-52412-2) MOD H-11 STEEL (RC 54-56)

(69-52412-3) 4340M STEEL (270-300 KSI)

ALL DIMENSIONS ARE IN INCHES

69-52412-2,-3 Bevel Gear Repair
Figure 601

BEVEL GEAR - REPAIR 7-1

69-52417–2, –3, –4

1. General

A. This procedure has the data necessary to refinish the bevel gear (385, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Bearing Surface Repair

A. Procedure (REPAIR 7-1, Figure 601)

CAUTION: GRINDING BEYOND SPECIFIED LIMIT IS NOT PERMITTED.

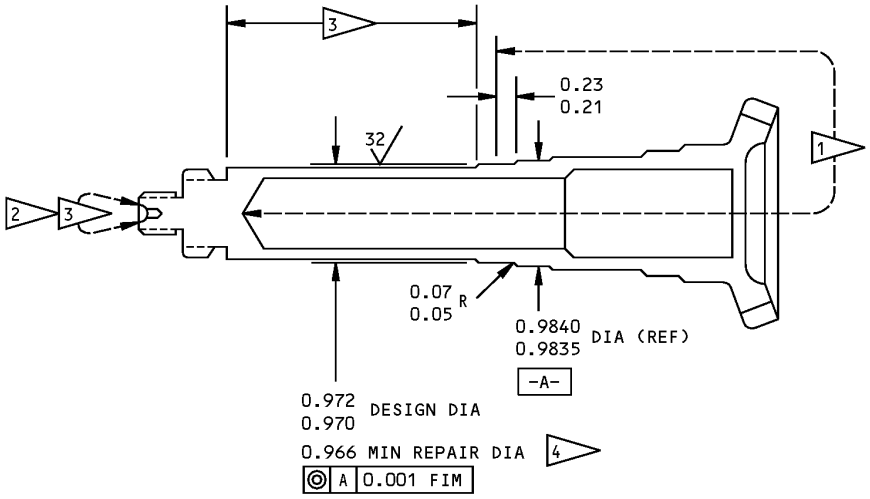
(1) Grind worn or damaged surface as required, within repair limit shown, to remove defects (SOPM 20-10-01).

(2) Stress relieve by heating to 900-950°F for 2 hours (69-52417-2) or to 500-550°F for 4 hours (69-52417-3,-4) then air-cooling at 65-75°F.

(3) Magnetic particle check per SOPM 20-20-01.

3. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 7-1, Figure 601.



REFINISH

69-52417-2: CADMIUM-TITANIUM ALLOY PLATE (F-15.01) EXCEPT AS NOTED. APPLY ONE COAT PRIMER, BMS 10-11, TYPE I

69-52417-3,-4: CADMIUM-TITANIUM ALLOY PLATE (F-15.01) 0.0005-0.0007 THICK EXCEPT AS NOTED. APPLY TWO COATS OF BMS 10-11 TYPE I PRIMER (F-20.03) ON INDICATED SURFACES ONLY

1. NO PLATING THIS AREA
2. PLATING OPTIONAL THESE SURFACES
3. APPLY PRIMER THESE SURFACES
4. GRIND WORN OD TO INDICATED FINISH. GRINDING BEYOND INDICATED LIMIT NOT PERMITTED

REPAIR

REF 4

BREAK SHARP EDGES 0.003-0.020

MATERIAL: (69-52417-2) MOD H-11 STEEL (RC 54-56)

(69-52417-3,-4) 4340M STEEL (270-300 KSI)

ALL DIMENSIONS ARE IN INCHES

69-52417-2,-3,-4 Bevel Gear Repair
Figure 601

YOKE - REPAIR 8-1

69-52420–3, –5, –7

1. General

A. This procedure has the data necessary to refinish the yoke (75, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Bolt Hole Rework

A. Procedure

(1) Machine attachment bolt holes to 0.3432-0.3442 inch diameter per SOPM 20-10-02. Break sharp edges of reworked holes 0.003-0.020.

(2) Attach tag to reworked yoke, stating "Bolt holes are oversize. Use oversize bolts, NAS3005E23 or equivalent, to attach ballscrew. Bolt holes in ballscrew must be 0.3432-0.3442 in. dia to match."

3. Yoke ID Corrosion Removal

A. Procedure (REPAIR 8-1, Figure 601)

(1) Magnetic particle examine per SOPM 20-20-01.

(2) Machine yoke ID as required, within repair limit, to remove defects (SOPM 20-10-01). Finish should be 63 microinches or better. No step or mismatch is allowed.

(3) Shot peen machined area using size and intensity specified (SOPM 20-10-03).

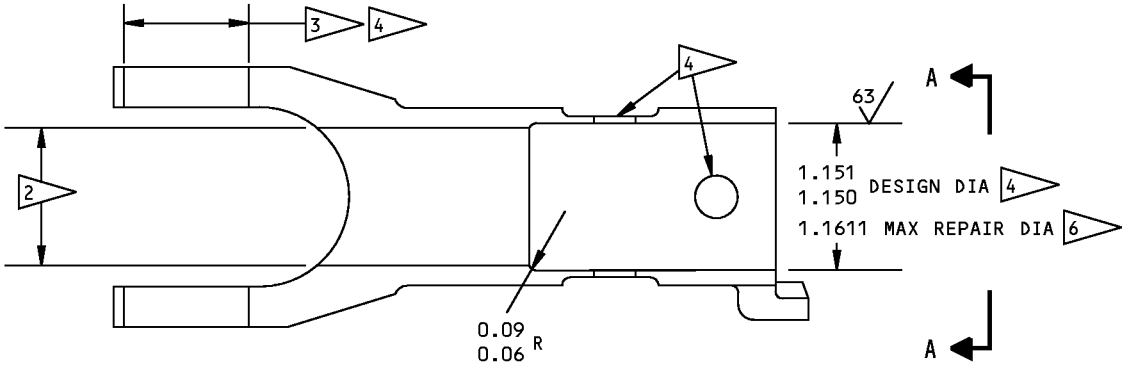
(4) Build up ID with chrome plate per SOPM 20-42-03.

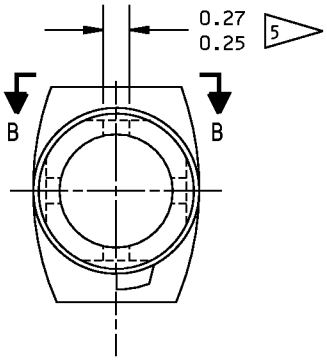
(5) Grind ID to design diameter and finish noted (SOPM 20-10-04).

(6) Magnetic particle examine per SOPM 20-20-01.

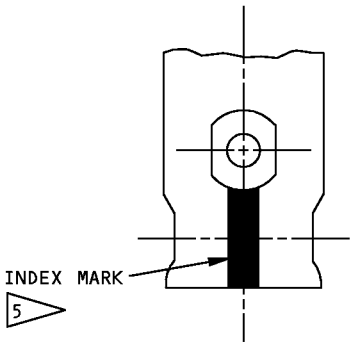
4. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 8-1, Figure 601.





A–A



B–B

REFINISH

CADMIUM–TITANIUM ALLOY PLATE (F–15.01) ALL OVER EXCEPT AS NOTED. APPLY TWO COATS PRIMER, BMS 10–11, TYPE 1 (F–20.03) EXCEPT AS NOTED

1 (DELETED)

2 CADMIUM–TITANIUM PLATING OPTIONAL THIS SURFACE

3 CADMIUM–TITANIUM PLATE 0.0003–0.0005 THICK

4 NO PRIMER THIS SURFACE

5 APPLY INDEX MARK PER SOPM 20–50–05 USING BMS 10–60, TYPE 1 BLACK ENAMEL, THEN APPLY TOP COATING OVER INDEX MARK PER SOPM 20–44–01, TYPE 41

6 BUILD UP WITH HARD CHROME PLATE AND GRIND TO FINISH AND DIMENSIONS SHOWN. MAINTAIN 0.06–0.09 RADIUS IN TRANSITION. NO STEP OR MISMATCH ALLOWED. STOP CHROME PLATE 0.03 MINIMUM BEFORE 0.06–0.09 RADIUS

REPAIR

REF 6

SHOT PEEN (SOPM 20–10–03)
0.007–0.017 SIZE
0.008 A2 INTENSITY
2.0 COVERAGE

MATERIAL: (69–52420–3) MOD H–11 STEEL
(RC 54–56)
(69–52420–5,–7) 4340M STEEL
(270–300 KSI)

ALL DIMENSIONS ARE IN INCHES

128449 S0004993389_V2

69-52420-3,-5,-7 Yoke Repair
Figure 601

RETAINER - REPAIR 9-1

69-52469–1

1. General

A. This procedure has the data necessary to refinish the retainer (350, 435, IPL Figure 1).

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

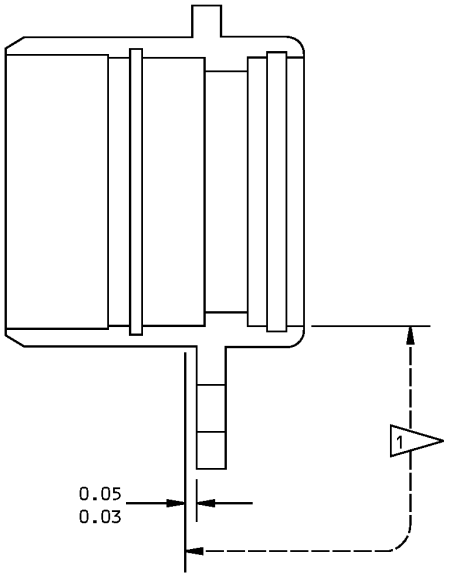
C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the consumable codes identified in this procedure.

D. Refer to IPL Figure 1 for item numbers.

2. Plating Repair

A. Procedure

(1) Repair consists of stripping and restoration of original finish. Refer to Refinish instruction in REPAIR 9-1, Figure 601.



REFINISH

CHROMIC ACID OR SULFURIC ACID ANODIZE (F-17.05) ALL OVER. APPLY ONE LAYER OF PRIMER, BMS 10-11, TYPE 1 (F-20.02) AS NOTED

1 APPLY PRIMER THESE SURFACES ONLY

2 (DELETED)

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

Retainer Refinish
Figure 601

SLEEVE - REPAIR 10-1

69-52473–1

1. General

A. This procedure has the data necessary to refinish the sleeve (425, IPL Figure 1).

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

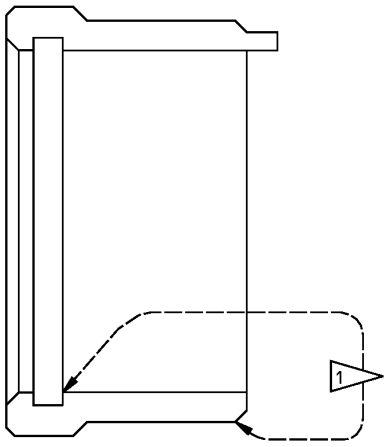
C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the consumable codes identified in this procedure.

D. Refer to IPL Figure 1 for item numbers.

2. Plating Repair

A. Procedure

(1) Repair consists of stripping and restoration of original finish. Refer to Refinish instruction in REPAIR 10-1, Figure 601.



REFINISH

CADMIUM PLATE (F-15.06) AS NOTED

MATERIAL: 4340 STEEL
RC 32-38 (150-170 KSI)

1 PLATE THESE SURFACES ONLY

Sleeve Refinish
Figure 601

SLEEVE - REPAIR 11-1

69-52474–1

1. General

A. This procedure has the data necessary to refinish the sleeve (340, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Plating Repair

A. Procedure

(1) Repair consists of stripping and restoration of original finish. Refer to Refinish instruction in REPAIR 11-1, Figure 601.

3. Sleeve, Seal Surface Repair

A. Procedure

CAUTION: DO NOT GRIND MORE THAN THE SPECIFIED LIMIT OR THE PART CAN BE DAMAGED.

(1) Grind seal diameter to remove defects, repair limit 1.100 minimum diameter.

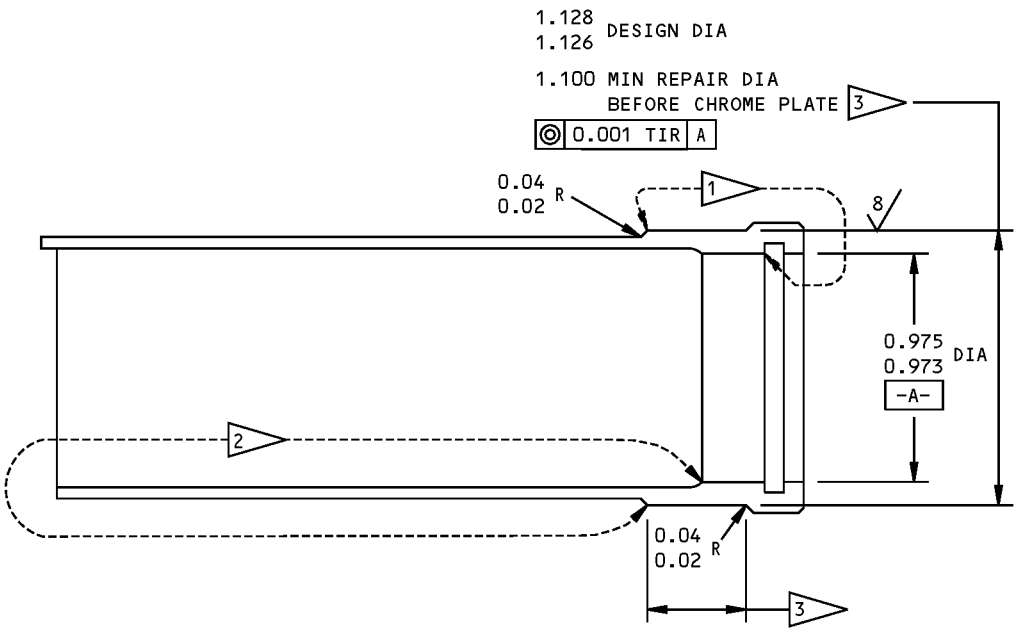
(2) Stress relieve by heating to 350-400 degrees F for 4 hours then cooling at 65-75 degrees F.

(3) Magnetic particle examine per SOPM 20-20-01.

(4) Build up seal diameter with chrome plate per SOPM 20-42-03.

(5) Grind to design diameter of 1.126-1.128 per SOPM 20-10-04, surface finish must be 8 microinch or better.

(6) Refinish the sleeve as shown in REPAIR 11-1, Figure 601.



REFINISH

CADMIUM PLATE (F-1.103) EXCEPT AS NOTED.
APPLY BMS 10-11, TYPE 1 PRIMER (F-20.02)
AS NOTED

1. NO CADMIUM PLATE THESE SURFACES
2. APPLY PRIMER THESE SURFACES
3. BUILD UP WITH CHROME PLATE AND GRIND TO DESIGN DIMENSION AND FINISH SHOWN

REPAIR

REF 3

BREAK ALL SHARP EDGES 0.003-0.020

MATERIAL: 4330M STEEL RC 32-38 (150-170 KSI)

ALL DIMENSIONS ARE IN INCHES

69-52474-1 Sleeve Repair
Figure 601

UNIVERSAL JOINT SPACER - REPAIR 12-1

69-60053–1, –2

1. General

A. This procedure has the data necessary to refinish the universal joint spacer (70, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Bearing Surface Repair

A. Procedure (REPAIR 12-1, Figure 601)

(1) Machine diameter as required, within repair limit shown, to remove defects (SOPM 20-10-02).

(2) Stress relieve by heating to 900-950°F for 2 hours (69-60053-1), or to 500-550°F (69-60053-2) for 4 hours, then air-cooling at 65-75°F. Magnetic particle check per SOPM 20-20-01.

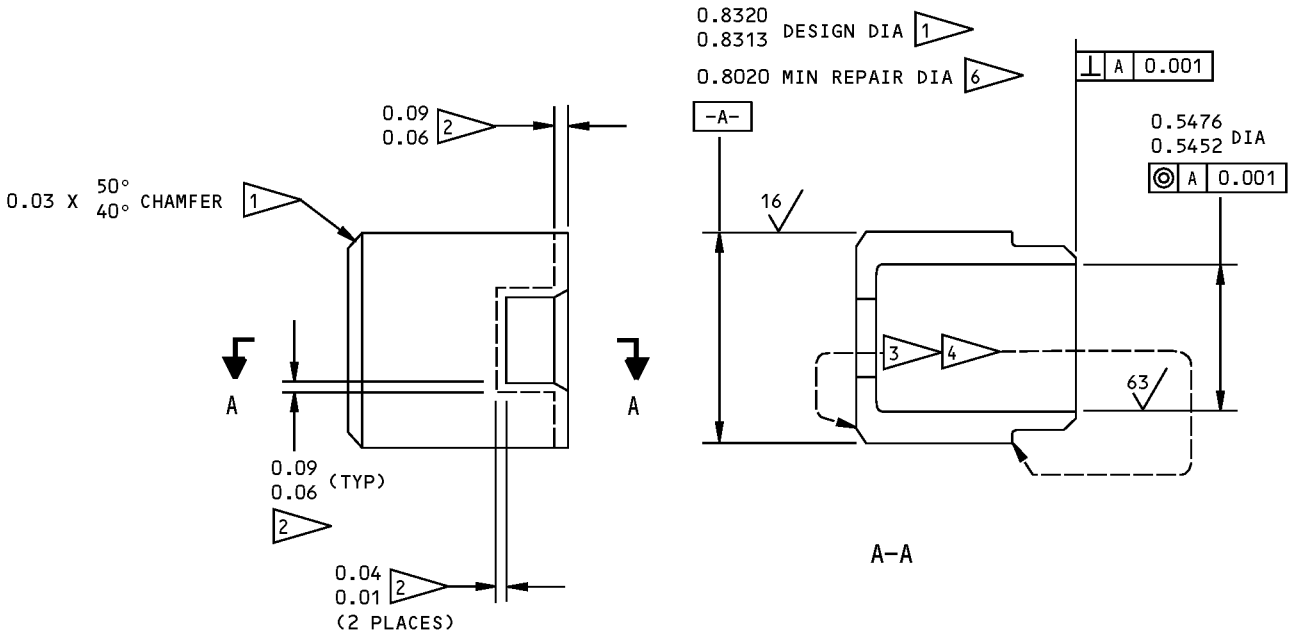
(3) Shot peen as indicated (SOPM 20-10-03).

(4) Build up repaired area with chrome plate per SOPM 20-42-03 and grind to design dimensions and finish shown SOPM 20-10-04.

(5) Magnetic particle check per SOPM 20-20-01.

3. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 12-1, Figure 601.



REFINISH

CHROME PLATE PER 1 2 .

CADMIUM-TITANIUM PLATE ALL OTHER SURFACES PER 3 . APPLY ONE COAT PRIMER PER 4

1 CHROME PLATE (F-15.04) 0.003-0.005 THICK

2 CHROME PLATE RUNOUT. AREA NOT CHROME PLATED MUST BE PLATED AND PRIMED PER 3 AND 4

3 CADMIUM-TITANIUM ALLOY PLATE (F-1.181) 0.0005-0.0007 THICK

4 APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (SRF-12.205)

5 DELETED

6 BUILD UP WITH CHROME PLATE AND GRIND TO DESIGN DIMENSIONS AND FINISH SHOWN. OBSERVE PLATING RUNOUT AS NOTED

REPAIR

REF 6

125 ALL MACHINED SURFACES EXCEPT AS NOTED

BREAK SHARP EDGES 0.005-0.015R

SHOT PEEN: 0.017-0.033 SHOT SIZE
0.015 A2 INTENSITY

MATERIAL: (69-60053-1) MOD H-11 STEEL
(RC 54-56)
(69-60053-2) 4340M STEEL
(270-300 KSI)

ALL DIMENSIONS ARE IN INCHES

69-60053-1,-2 Universal Joint Spacer Repair
Figure 601

CROSS PIN - REPAIR 13-1

69-60057–1, –2

1. General

A. This procedure has the data necessary to refinish the cross pin (80, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Bearing Surface Repair

A. Procedure (REPAIR 13-1, Figure 601)

(1) Machine diameter as required, within repair limit shown, to remove defects (SOPM 20-10-02).

(2) Stress relieve by heating 900-950°F for 2 hours (69-60057-1), or to 500-550°F for 4 hours (69-60057-2), then air-cooling at 65-75°F. Magnetic particle check per SOPM 20-20-01.

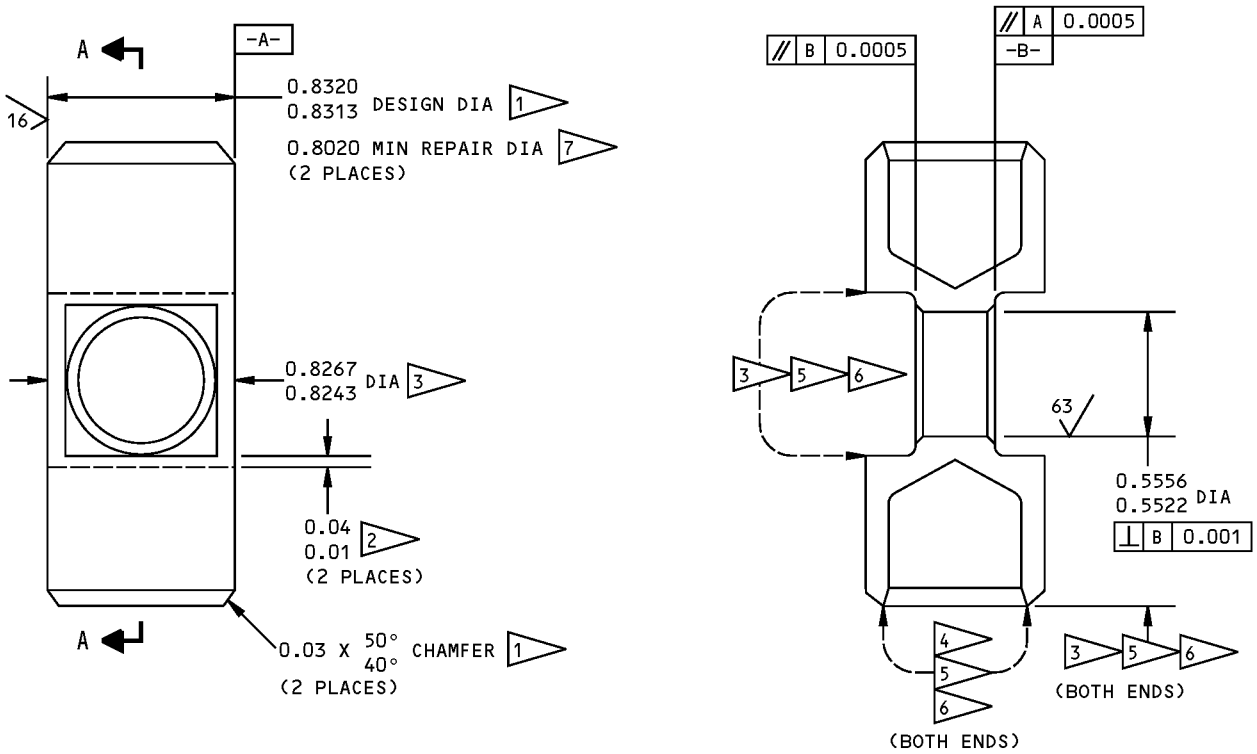
(3) Shot peen as indicated per (SOPM 20-10-03).

(4) Build up repaired area with chrome plate per SOPM 20-42-03 and grind (SOPM 20-10-04) to design dimensions and finish shown.

(5) Magnetic particle check per SOPM 20-20-01.

3. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 13-1, Figure 601.



A-A

REFINISH

CHROME PLATE PER 1 2. CADMIUM-TITANIUM PLATE ALL OTHER SURFACES PER 3 4. APPLY ONE COAT PRIMER PER 5 AND ONE COAT ENAMEL PER 6

1 CHROME PLATE (F-15.04) 0.003-0.005 THICK

2 CHROME PLATE RUNOUT. AREA NOT CHROME PLATED MUST BE PLATED AND PRIMED PER 3 AND 5

3 CADMIUM-TITANIUM ALLOY PLATE (F-1.181) 0.0005-0.0007 THICK

4 CADMIUM-TITANIUM PLATE THROW-IN PREFERRED

5 APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (SRF-12.205)

6 APPLY ONE COAT ENAMEL, BMS 10-11, TYPE 2 (SRF-12.63)

7 BUILD UP WITH CHROME PLATE AND GRIND TO DESIGN DIMENSIONS AND FINISH SHOWN. OBSERVE PLATING RUNOUT AS NOTED

REPAIR

REF 7

125 ALL MACHINED SURFACES EXCEPT AS NOTED

BREAK SHARP EDGES 0.005-0.015R

SHOT PEEN: 0.017-0.033 SHOT SIZE
0.015 A2 INTENSITY

MATERIAL: (69-60057-1) MOD H-11 STEEL
(RC 54-56)
(69-60057-2) 4340M STEEL
(270-300 KSI)

ALL DIMENSIONS ARE IN INCHES

69-60057-1,-2 Cross Pin Repair
Figure 601

TRUNNION CROSS - REPAIR 14-1

69-60059–1

1. General

A. This procedure has the data necessary to refinish the trunnion cross (85, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Exterior Face Repair

A. Procedure (REPAIR 14-1, Figure 601)

(1) Machine faces as required, within repair limits shown, to remove defects (SOPM 20-10-02). Magnetic particle check per SOPM 20-20-01.

(2) Shot peen as indicated (SOPM 20-10-03).

(3) Build up repaired area with chrome plate per SOPM 20-42-03 and grind to design dimensions and finish shown (SOPM 20-10-04).

(4) Magnetic particle check per SOPM 20-20-01.

3. Bore Repair

A. Procedure (REPAIR 14-1, Figure 601)

(1) Machine bore as required, within repair limits shown, to remove defects (SOPM 20-10-02). Magnetic particle check per SOPM 20-20-01.

(2) Shot peen as indicated (SOPM 20-10-03.

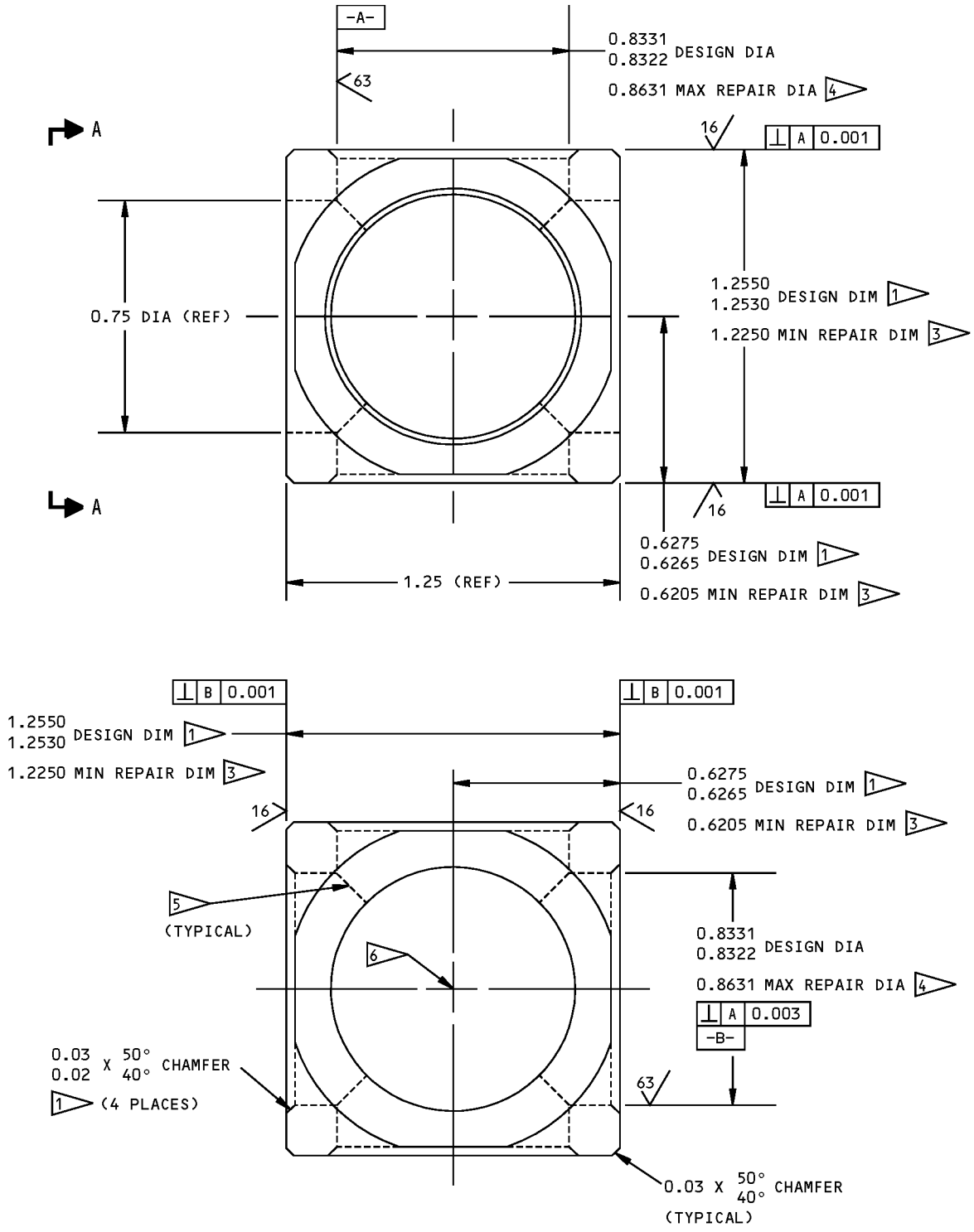
(3) Build up repaired surface with nickel plate to 0.004-0.006 inch single plate thickness per SOPM 20-42-09.

(4) Complete buildup with chrome plate per SOPM 20-42-03 and grind to design dimensions and finish shown (SOPM 20-10-04). Total plating thickness (nickel plus chrome) after machining to be 0.015 inch maximum.

(5) Magnetic particle check per SOPM 20-20-01.

4. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 14-1, Figure 601.



A-A

69-60059-1 Trunnion Cross Repair
Figure 601 (Sheet 1 of 2)

REFINISH

PASSIVATE (F-17.09) ALL OVER. CHROME PLATE EXTERNAL FACES PER 1 2

1 CHROME PLATE (F-15.04) 0.003-0.005 THICK

2 (DELETED)

3 BUILD UP WITH CHROME PLATE AND GRIND TO DESIGN DIMENSIONS AND FINISH SHOWN. OBSERVE PLATING RUNOUT AS NOTED

4 BUILD UP WITH NICKEL PLATE (0.004-0.006 THICK) AND CHROME PLATE. GRIND TO DESIGN DIMENSIONS AND FINISH SHOWN. TOTAL PLATING THICKNESS AFTER MACHINING NOT TO EXCEED 0.015

5 BREAK SHARP EDGES AT INTERSECTION OF HOLES 0.003-0.020

6 CENTERLINES OF -A- AND -B- MUST INTERSECT WITHIN 0.002

REPAIR

REF 3 4

125 ALL MACHINED SURFACES EXCEPT AS NOTED

BREAK SHARP EDGES 0.010-0.030 R EXCEPT AS INDICATED

SHOT PEEN: 0.017-0.033 SHOT SIZE
0.012 A2 INTENSITY

MATERIAL: 15-5PH CRES (180-200 KSI)

ALL DIMENSIONS ARE IN INCHES

69-60059-1 Trunnion Cross Repair
Figure 601 (Sheet 2 of 2)

BOEING®

COMPONENT MAINTENANCE MANUAL

TORQUE BRAKE ASSEMBLY - REPAIR 15-1

176667–2

1. General

A. This procedure has the data necessary to refinish the torque brake assembly (230, IPL Figure 1).

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

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

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

E. Refer to IPL Figure 1 for item numbers.

2. Torque Brake Rework

A. Procedure (IPL Figure 1)

CAUTION: REWORK PER FOLLOWING PROCEDURES MAY AFFECT INTERCHANGEABILITY IN ANY FUTURE OVERHAUL OR REPLACEMENT.

(1) To shift torque lockout level to a higher value, machine housing (285) ID as shown in REPAIR 15-1, Figure 601.

(2) To shift torque lockout level to a lower value, proceed as follows:

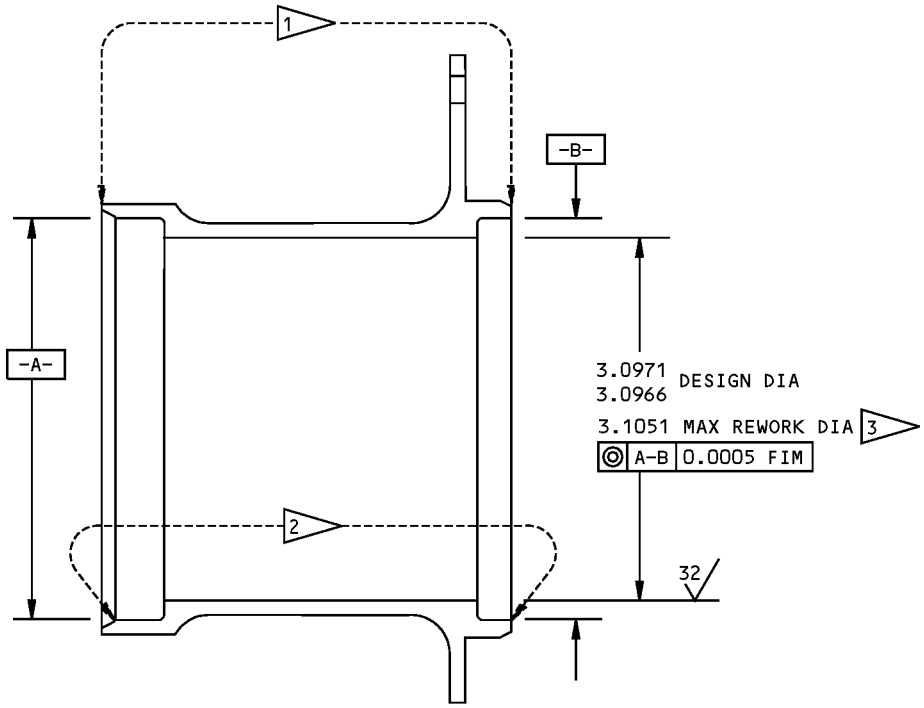
(a) Machine spring set (280) and stress relieve per REPAIR 15-1, Figure 601. Note amount of material removed.

(b) Build up OD of sleeves (260, 265) with chrome plate per SOPM 20-42-03 and grind to required dimensions and finish SOPM 20-10-04). Finished diameter is to be equal to original OD plus amount of increase in spring set ID +0.0000/-0.0005 inch.

NOTE: A shift in torque lockout level changes maximum and minimum lockout levels corresponding amounts.

3. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 15-1, Figure 601.



REFINISH

CADMIUM PLATE (F-15.23) AS NOTED. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (SRF-12.205) ON EXTERNAL SURFACES EXCEPT IN BOLT HOLES

1. CADMIUM PLATE THESE SURFACES
2. CARBURIZE, 0.025-0.035 DEEP
3. MACHINE ID AS REQUIRED TO CHANGE TORQUE SETTING. TORQUE SETTING INCREASES (TBP) LB-IN. FOR EACH 0.001 INCREASE IN ID

REPAIR

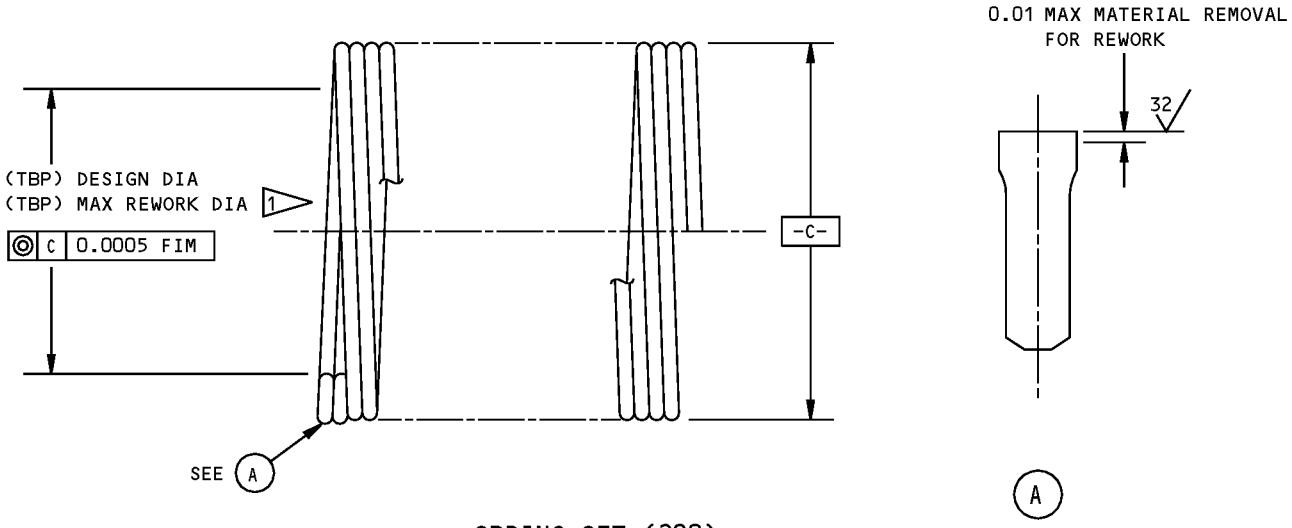
REF 4

BREAK SHARP EDGES 0.003-0.020 R

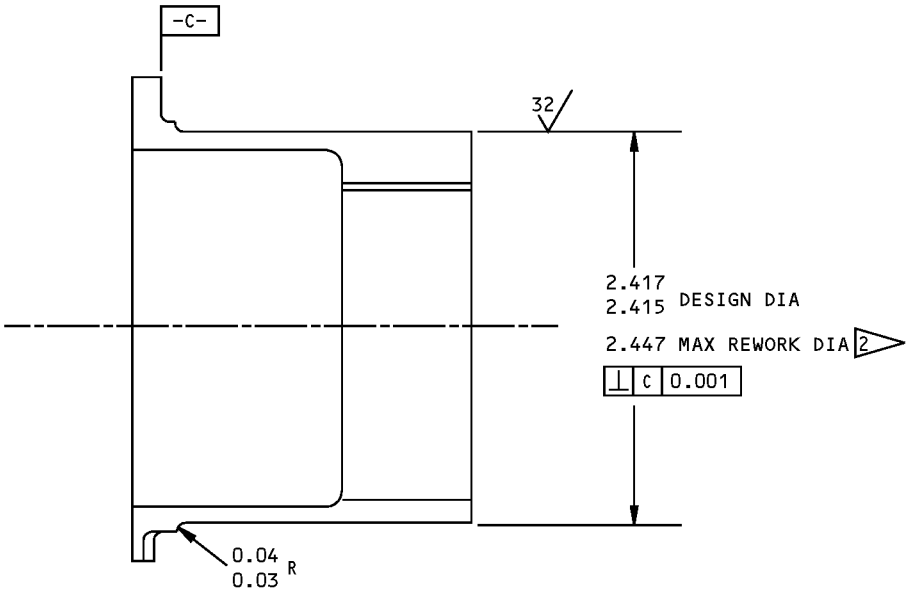
MATERIAL: STEEL, 145 KSI MIN CORE

ALL DIMENSIONS ARE IN INCHES

176667-2 Housing Rework and Refinish
Figure 601

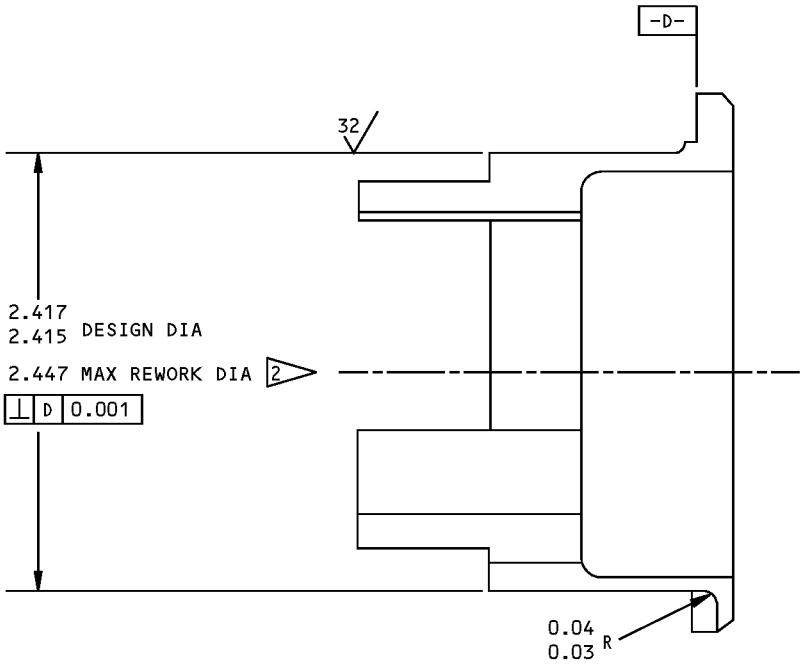


SPRING SET (280)



SLEEVE (260)

176667-2 Spring Set and Sleeve Rework
Figure 602 (Sheet 1 of 2)



SLEEVE (265)

REWORK

1 MACHINE SPRING SET (280) ID AS REQUIRED TO CHANGE TORQUE SETTING. TORQUE SETTING DECREASES (TBP) LB-IN FOR EACH 0.001 INCREASE IN ID. NOTE AMOUNT OF INCREASE

STRESS RELIEVE AS FOLLOWS:
1. 320-330°F FOR 1 HOUR
2. 625-675°F FOR 1 HOUR
3. 920-930°F FOR 2 HOURS
4. AIR-COOL AT 65-75°F

2 BUILD UP SLEEVE (260,265) OD WITH HARD CHROME PLATE PER 20-42-02. GRIND TO FINISHED DIA EQUAL TO ORIGINAL OD PLUS INCREASE IN SPRING SET ID +0.0000/-0.0005

MATERIAL: STEEL, 290-300 KSI

SHOT PEEN (SLEEVES): 0.010-0.019 SHOT SIZE
0.012-0.015 A2 INTENSITY

BREAK SHARP EDGES 0.005-0.015R

ALL DIMENSIONS ARE IN INCHES

176667-2 Spring Set and Sleeve Rework
Figure 602 (Sheet 2 of 2)

NAMEPLATE - REPAIR 16-1

69-52461–1

1. General

A. This procedure has the data necessary to refinish the nameplate (505, IPL Figure 1).

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

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

D. Refer to IPL Figure 1 for item numbers.

2. Nameplate Replacement

A. Procedure (IPL Figure 1)

(1) Remove damaged or defective nameplate (505).

(2) Clean and prepare gear housing (475, 480) mounting surface per SOPM 20-50-12.

(3) Stamp new nameplate with part no. and serial no. and bend to contour of housing.

(4) Bond nameplate to housing with adhesive, A50090.

MISCELLANEOUS PARTS REFINISH - REPAIR 17-1

1. General

A. Instructions for the repair of the parts identified in REPAIR 17-1, Table 601 are for repair of the initial finish.

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

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

D. Refer to IPL Figure 1 for item numbers.

2. Miscellaneous parts refinish

A. Procedure

(1) Refer to REPAIR 17-1, Table 601 for refinish details.

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Washer (310,395)	4130 Steel 120-150 ksi	Cadmium plate per SOPM 20-42-05 all over.
Cover (30)	Al alloy 120-150 ksi	Chromic acid or sulfuric acid anodize (F-17.05) all over. Apply primer, C00259 (F-20.02) on exposed external surfaces only.
Coupling (315,400)	4340 Steel 150-180 ksi	Cadmium-titanium alloy plate (F-15.01) all over, except plating optional on bolt holes.
Retainer (330,415)	Al alloy	Chromic acid or sulfuric acid anodize (F-17.05). Apply primer, C00259 (F-20.02) all over.
Spacer (125)	Al alloy	Sulfuric acid anodize (F-17.03) all over.
Washer (50B)	6150 Steel RC 48-52	Phosphate coat per AMS 2481.
Adapter (290B)	Mod H-11 Steel RC 54-56	Phosphate coat per AMS 2481.

ASSEMBLY

1. General

A. This procedure has the data necessary to assemble the trailing edge flap drive system no. 3 and 6 transmission assemblies.

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

C. Refer to IPL Figure 1 for item numbers.

2. Lubrication

A. Install all packings and seals with hydraulic fluid, D00070.

B. Immerse internal parts in hydraulic fluid, D00070 and assemble while wet.

3. Assembly

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-5415	Splined Coupling Spanner Wrench (Part #: F71228-500, Supplier: 81205)
SPL-5462	Adapter - Torque Wrench (Part #: ST6105-3, Supplier: 71791)
SPL-5463	Spring Expansion Fixture (Part #: ST6107, Supplier: 71791)

B. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I
C00528	Compound - Corrosion Preventive, Petroleum Hot Application (Soft Film)	MIL-C-11796, Class III
D00070	Fluid - Hydraulic, Petroleum Base	MIL-PRF-5606 (Replaces MIL-H-5606)
G01048	Lockwire - Corrosion Resistant Steel (0.032 In. Dia.)	NASM20995˜ C32
G01912	Lockwire - Monel (0.032 In. Dia.)	NASM20995N˜ C32 (QQ-N-281)

C. References

Reference	Title
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-03	LUBRICANTS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

D. Procedure (IPL Figure 1)

NOTE: During installation of packings, care must be taken so that no damage is done to them.

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

(1) Determine shim (355, 440) thicknesses (ASSEMBLY, Figure 701).

NOTE: If bearings (370, 455), retainers (350, 435), or housing assembly (475 or 480) have not been replaced, shims removed during disassembly may be reinstalled.

(a) Install bearings (370, 455) on gears (385, 470), then position parts on retainers (350, 435). Determine shim (355, 440) thicknesses X1, X2 as shown in figure.

(b) Remove bearings from gears.

(2) Determine shim (365, 450) thicknesses.

NOTE: If bearings (370, 455) or retainers (350, 435) have not been replaced, shims (365, 450) removed during disassembly may be reinstalled.

(a) Select shims (365, 450) to obtain 0.000-0.003 in. axial end play of bearings (370, 455) between retainer (350, 435) shoulders and retaining rings (375, 460).

(b) Assemble shims and bearings in retainers and secure with retaining rings.

(3) Install bevel gears and associated parts.

(a) Install packings (360, 445) in housing assembly (475 or 480).

(b) Install bearings (380, 470) on bevel gears (385, 470), then insert gears in housing.

NOTE: Install gears through large opening for cover (110).

(c) Fill grooves in ID of retainers (350, 435) with sealant, A00247.

(d) Install retainers with shims (355, 440) over bevel gear shafts and onto housing. Install packings (345, 430) in sleeves (340, 425), then install sleeves over shafts. Insert seals (335, 420) over sleeves into retainers. Remove excess sealant, A00247 from around seals.

(e) Install retainers (330, 415) and secure with bolts (320, 405) and washers (325, 410). Tighten bolts to 80-100 lb-in.

(4) Assemble torque brake assembly (ASSEMBLY, Figure 702).

NOTE: Coat all surfaces of torque brake components with hydraulic fluid, D00070 as parts are assembled.

(a) Position ends of springs in spring set (280) approximately 180 degrees apart.

NOTE: Spring set (280) consists of two matched springs coiled together.

(b) Place spring set in the ST6107 Spring Expansion Fixture, SPL-5463. Move fixture spring stops inward so as to contact spring ends when springs are wound. Tighten all four stops sufficiently to hold, yet permit movement when tapped with an aluminum drift.

(c) Wind spring by rotating fixture drive shaft with socket wrench until spring set OD is snug against fixture sleeve. Lock drive shaft in position with lockscrew.

(d) Using an aluminum drift, tap all four spring ends axially to snug spring coils together.

(e) Use aluminum drift to tap spring stops outward on one side of fixture, just far enough to clear flange of sleeve (260). Insert sleeve into spring set until flange is firmly seated.

(f) Use aluminum drift to tap spring stops outward on opposite side of fixture, just far enough to clear flange of sleeve (265). Insert sleeve into spring set so internal lugs align with sleeve (260). Ensure that both sleeves (260, 265) are properly seated.

(g) Insert adapter (275) into sleeve (260) with ears of adapter partially engaging sleeve lands, and splined end of adapter protruding approximately one inch from sleeve flange. Support adapter (275) and unlock fixture drive shaft. Unwind spring set by rotating drive shaft.

NOTE: Spring friction will retain sleeves and adapter.

CAUTION: USE CARE TO AVOID DROPPING SPRING PACK, OR REASSEMBLY MAY BE NECESSARY.

(h) Loosen spring stops on both sides of fixture and move stops outward to clear spring pack. Remove spring pack from fixture by tapping with aluminum drift.

(i) Place assembled parts in arbor press. Protect end faces of sleeves (260, 265) and apply 300-500 pounds end load to stack springs tight. Install end rings (255) over spring set and press down to remove clearance and end play.

(j) Measure stacked height of assembled parts. Select shims (270) as required to obtain 3.052-3.064 inch dimension. Remove end rings and install shims as shown in ASSEMBLY, Figure 703. Use identical shims at 2 places 180 degrees apart on same end of assembly. Use minimum number of shims by selecting larger sizes. When more than one shim is required, use same thickness, within 0.01 inch, at each end.

NOTE: Required dimension may be obtained in some cases without shims, or with shims at one end only. Two shims may be stacked together to increase range. Maximum thickness allowed is 0.09 inch at each end (one 0.04-inch shim plus one 0.05-inch shim).

(k) Trim shims, as necessary, so ends do not protrude beyond spring set OD.

(l) If assembled spring pack assembly (250) is to be stored as a spare, install both end rings and secure assembly with lockwire, G01048 (size optional).

(m) For current installation of spring pack, install one end ring (255) on sleeve (260) end. Insert opposite end of spring pack into housing (285), then press remaining end ring into housing and over spring set.

(n) Install supports (240, 245) on ends of housing, tapping as necessary to ensure supports are firmly seated and properly aligned.

(5) Determine shim (300) thickness (ASSEMBLY, Figure 701).

(a) Position torque brake assembly (230) vertically with support (240) at bottom. Place bearing (295) on torque brake and apply load to stack parts tightly. Alternatively, install torque brake and bearing in housing assembly (475 or 480) with parts (210 thru 225).

(b) Determine shim thickness X3 as shown in figure.

(6) Install torque brake assembly.

(a) Install bearing (295) on adapter (290), then install together with shim (300) in housing assembly.

(b) Install torque brake assembly into housing and secure with parts (210 thru 225). Tighten nuts (210) to 180-250 lb-in.

(7) Assemble ring gears.

(a) Install bearing (145) on gear (175) or driver (185). Ensure that bearing is firmly seated on shoulder of gear or driver.

(b) Place spacer (125) in cover (110), then position gear (175) or driver (185) in cover. Determine shim (120) thickness X4 or X6 per ASSEMBLY, Figure 701.

NOTE: If bearing (145), gear (175) or driver (185), spacer (125), cover (110), or housing assembly (475 or 480) have not been replaced, shim (120) removed during disassembly may be reinstalled.

(c) Remove gear or driver, with bearing, from cover. Install shim (120) on spacer, then reinstall parts in cover. Determine shim (170 or 195) thickness X5 or X7 per ASSEMBLY, Figure 701.

NOTE: If gear (165) or gears (190, 200) also have not been replaced, shim (170 or 195) removed during disassembly may be reinstalled.

(d) Install shim (170) between gears (165, 175) or install shim (195) between gears (190, 200). Secure assemblies with parts (150, 155, 160 or 180). Tighten nuts (150) to 90-125 lb-in.

(e) Install bearing (205) on gear (175) or driver (185). Ensure that bearing is firmly seated.

(8) Install ring gears and check backlash.

(a) Install assembled ring gears (165 thru 175, or 185 thru 200) in housing. Press down evenly on gears to seat units. Rotate gears to ensure that parts are meshing evenly.

(b) Install cover (110) with spacer (125) and shim (120), using bolts (100) and washers (105).

NOTE: Parts are being installed temporarily, to check backlash. Seal (135) and packing (115) are not installed at this time.

(c) Check that backlash at each gear mesh is 0.002-0.008 in. Check backlash at minimum of 4 equally-spaced locations in one full rotation of the ring gears.

(d) Slowly rotate output bevel gear (385) through 4 turns using a torque wrench and note any variations in torque greater than 3 lb-in. Check backlash at any such points of high or low torque.

(e) Adjust thickness of shims (120, 170 or 195, 355, 440) as required to obtain proper backlash.

(9) Assemble parts in gear housing.

(a) Remove parts (100, 105) and cover (110), shim (120), and spacer (125).

(b) Remove ring gear assembly from housing. Insert short splined end of torque brake coupling (235) into gear (175) or driver (185), and secure parts with ring (140). Reinstall parts in housing, making sure coupling (235) is aligned correctly with sleeve (265) and adapter (275).

(c) Fill groove in ID of cover (110) with sealant, A00247. Install seal (135) in cover and remove excess sealant.

(d) Install bearing (130) in cover and packing (115) on cover OD. Install cover with spacer (125) and shim (120) and secure with parts (100, 105). Tighten bolts (100) to 80-100 lb-in.

(10) Assemble universal joint assembly (55).

(a) Position trunnion cross (85) in yoke (75) and insert cross pin (80) through yoke and cross.

CAUTION: KEEP BEARING SURFACES OF BOLT (65) FREE OF CORROSION PREVENTIVE COMPOUND OR ASSEMBLY MAY BIND OR EXPERIENCE EXCESSIVE WEAR.

(b) Coat shank and threads of bolt (65) with compound, C00528, per ASSEMBLY, Figure 704. Position output shaft (90) on cross and install bolt, spacer (70), and nut (60). Ensure that self-locking mechanism of nut develops torque of 25-100 lb-in. with no axial load on nut and thread fully engaged. Tighten nut to 170-200 lb-in. Check that full chamfer of bolt thread protrudes beyond locking mechanism of nut.

(11) Install universal joint assembly and cover (30).

CAUTION: DO NOT USE PREVIOUSLY INSTALLED WASHER (45), OF FAILURE OF TANGS AND LOSS OF NUT RETENTION MAY OCCUR.

(a) Insert output shaft (90) in housing assembly (475 or 480), then install parts (40 thru 50) on shaft. Tighten nut (40) to 200-240 lb-in. using torque wrench adapter, SPL-5462. Bend two tangs of lockwasher (45) into slots in nut to secure assembly.

(b) Install packing (35) on cover (30), then install cover on housing assembly. Secure with parts (20, 25). Tighten bolts (20) to 80-100 lb-in.

(12) Install couplings (315, 400) on bevel gears and secure with nuts (305, 390) and washers (310, 395). Hold coupling with F71228-500 Splined Coupling Spanner Wrench, SPL-5415 and tighten nut to 160-190 lb-in.

(13) Install drain plug (10) with new packing (15) in bottom of gear housing. Lockwire plug to housing with lockwire, G01912 per SOPM 20-50-02, double-twist method.

(14) Raise forward end of housing, tilting assembly until output shaft is at 13.25 degrees with respect to horizontal. Fill assembly through upper filler port with hydraulic fluid, D00070, until fluid reaches port level. Capacity range is 37-42 ounces. Install plug (10) with new packing (15). Lockwire plug to housing with lockwire, G01912 per SOPM 20-50-02, double-twist method.

(15) Functionally test unit per TESTING AND FAULT ISOLATION.

(16) Lockwire bolts (20, 100, 320, 405) in pairs with lockwire, G01912 . Use double-twist method per SOPM 20-50-02.

(17) Apply Glyptal across exposed bolt threads and nuts, and to lockwire ends, fasteners, and plugs, as applicable.

(18) Repair or touch up any surfaces with damaged or omitted finishes. Note areas especially susceptible to corrosion as follows, checking to ensure complete coverage with primer, C00259.

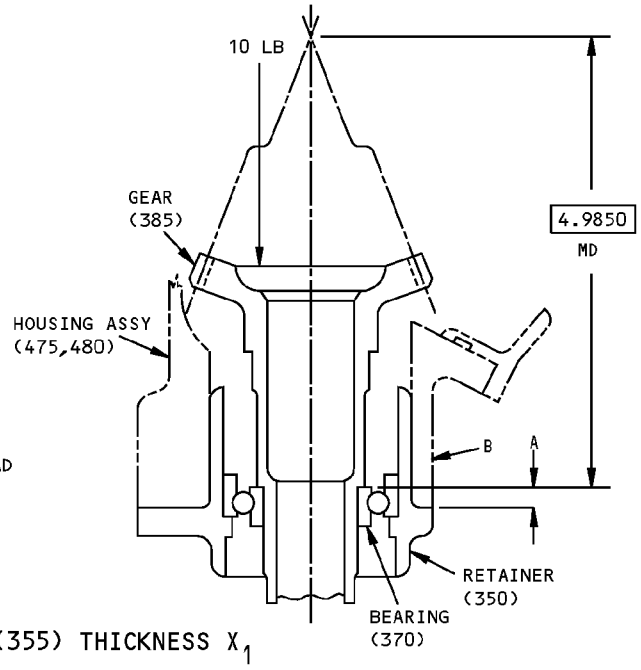
(a) Joints between seals (220) and housing (475 or 480)

(b) Joint between cover (30) and housing (475 or 480)

(c) Joint between cover (110) and housing (475 or 480)

(d) Joints between retainers (330, 350) and housing (475 or 480)

(e) Joints between retainers (415, 435) and housing (475 or 480)



SHIMMING CALCULATION

X_1 = A + MD − B + TOL

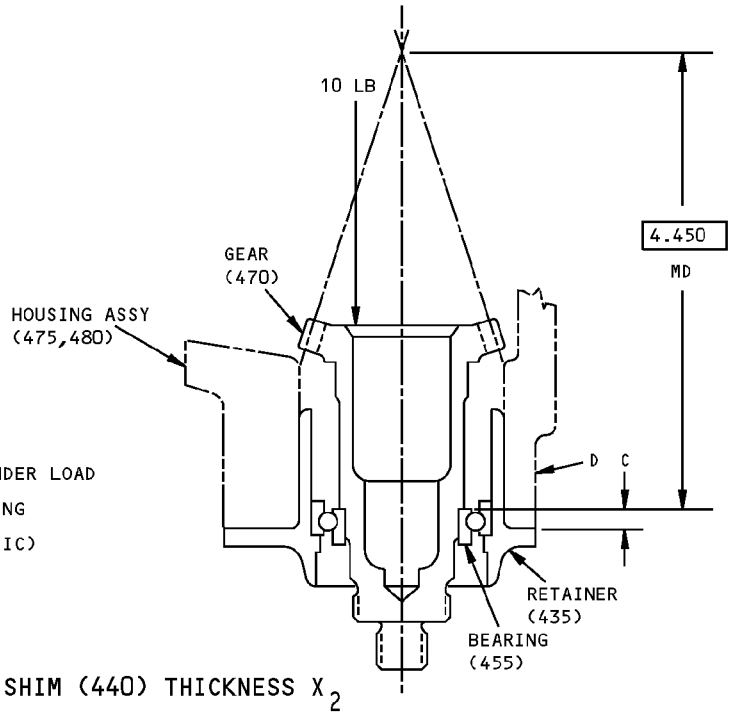
WHERE: A = MEASUREMENT WITH BEARING UNDER LOAD

B = DIMENSION ENGRAVED ON HOUSING

MD = GEAR MOUNTING DISTANCE (BASIC)

TOL = +0.003/−0.000

SHIM (355) THICKNESS X_1



SHIMMING CALCULATION

X_2 = C + MD − D + TOL

WHERE: C = MEASUREMENT WITH BEARING UNDER LOAD

D = DIMENSION ENGRAVED ON HOUSING

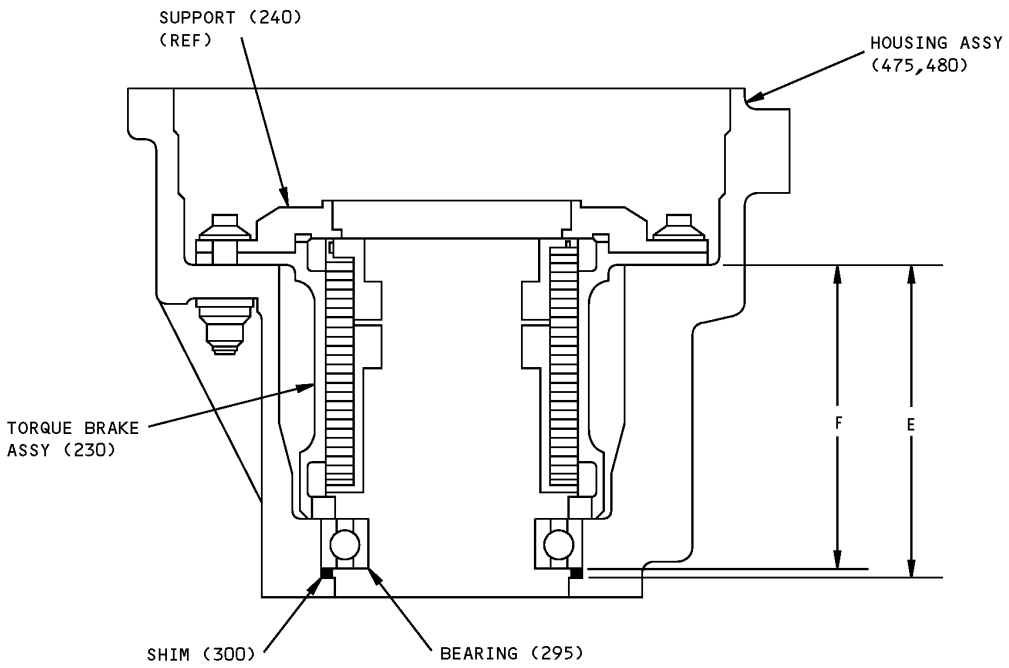
MD = GEAR MOUNTING DISTANCE (BASIC)

TOL = +0.003/−0.000

SHIM (440) THICKNESS X_2

ALL DIMENSIONS ARE IN INCHES

Shimming Diagrams
Figure 701 (Sheet 1 of 4)



SHIMMING CALCULATION

X_3 = E − F + INTERFERENCE

WHERE: E = MEASUREMENT ON HOUSING

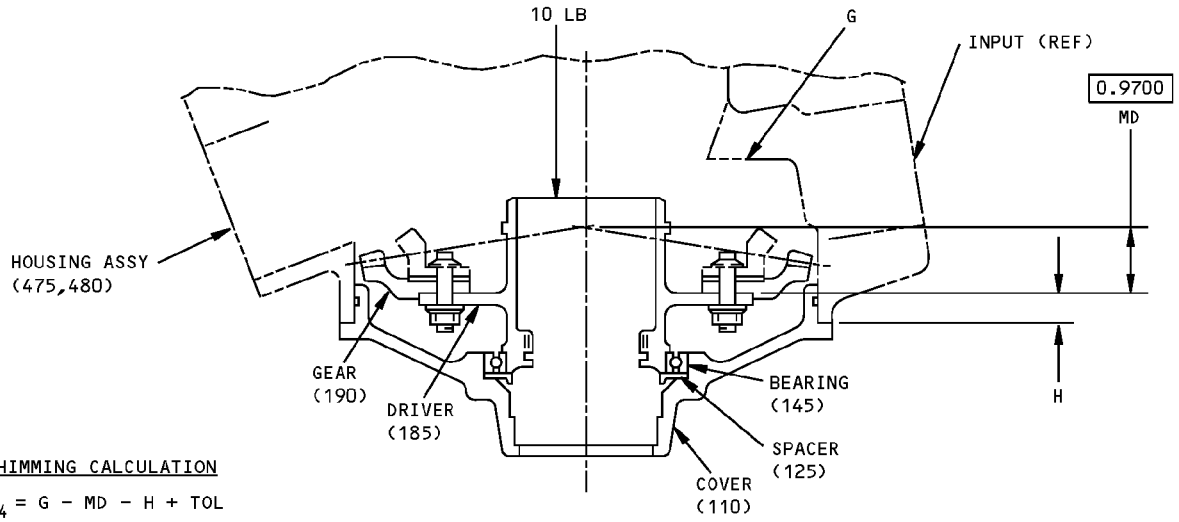
F = MEASUREMENT WITH PARTS STACKED TIGHTLY

INTERFERENCE = 0.001–0.003

ALL DIMENSIONS ARE IN INCHES

SHIM (300) THICKNESS X_3

Shimming Diagrams
Figure 701 (Sheet 2 of 4)



SHIMMING CALCULATION

$X_4 = G - MD - H + TOL$

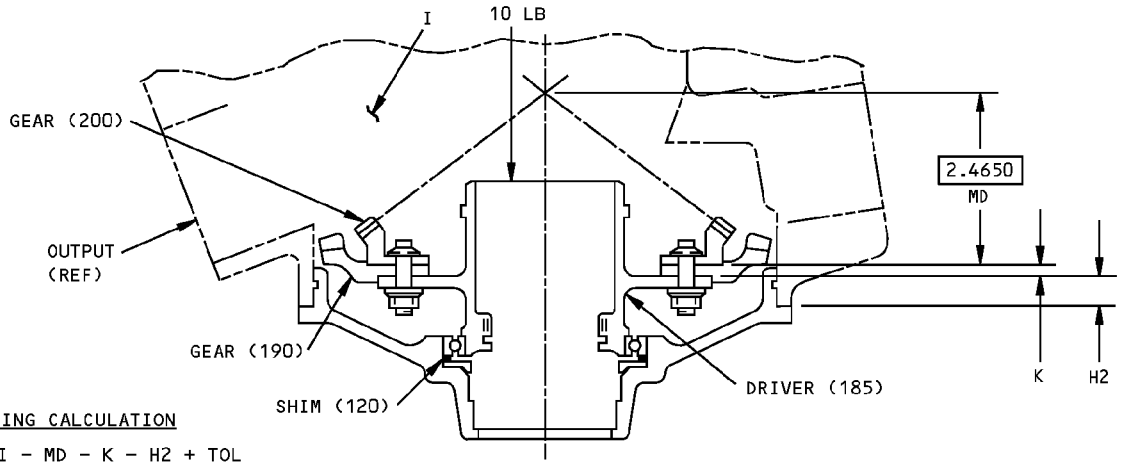
WHERE: G = DIMENSION ENGRAVED IN HOUSING ON INPUT SIDE

H = MEASUREMENT WITH BEARING UNDER LOAD

MD = GEAR (190) MOUNTING DISTANCE (BASIC)

TOL = +0.000/-0.003

SHIM (120) THICKNESS X_4 FOR ASSEMBLIES USING DRIVER (185)



SHIMMING CALCULATION

$X_5 = I - MD - K - H2 + TOL$

WHERE: I = DIMENSION ENGRAVED IN HOUSING ON OUTPUT SIDE

K = MEASUREMENT ON GEAR (190)

H2 = MEASUREMENT WITH BEARING UNDER LOAD (EQUALS $H + X_4$)

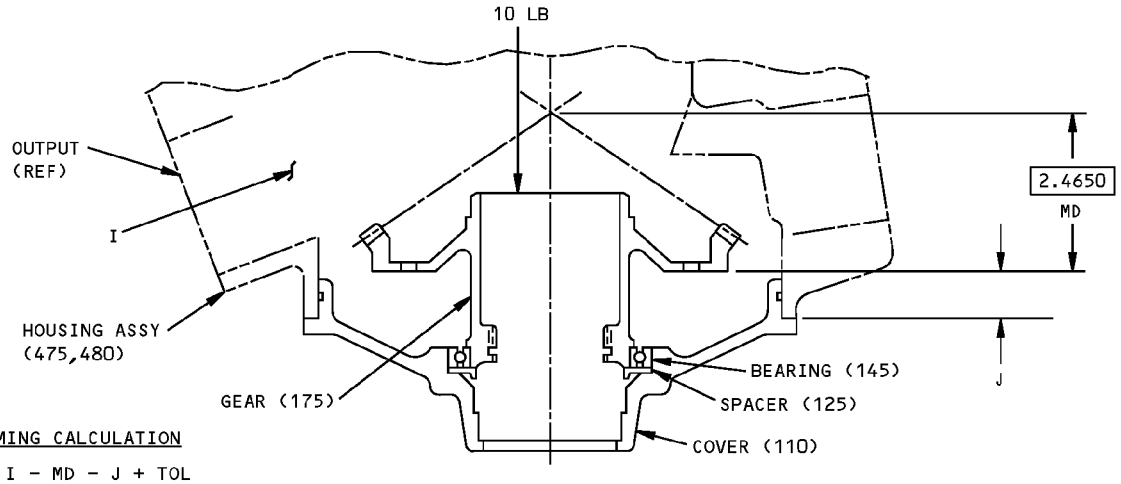
MD = GEAR (200) MOUNTING DISTANCE (BASIC)

TOL = +0.000/-0.003

SHIM (195) THICKNESS X_5 FOR ASSEMBLIES USING DRIVER (185)

ALL DIMENSIONS ARE IN INCHES

Shimming Diagrams
Figure 701 (Sheet 3 of 4)



SHIMMING CALCULATION

$X_6 = I - MD - J + TOL$

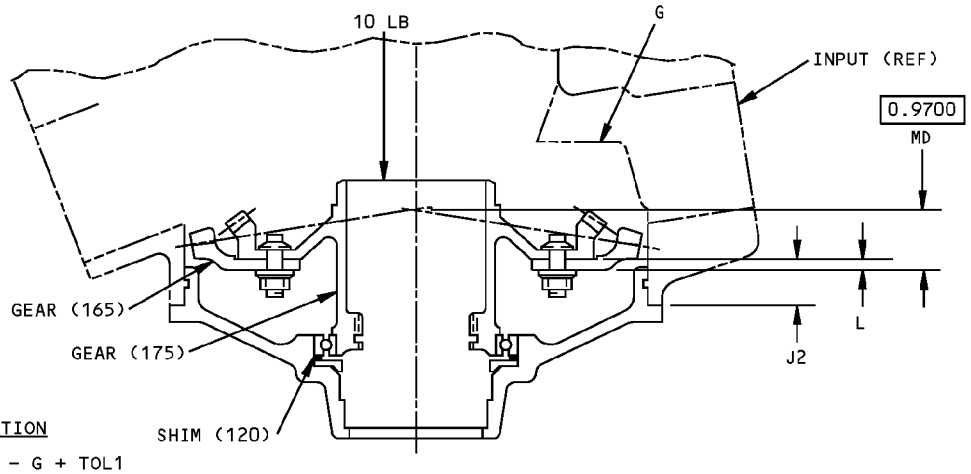
WHERE: I = DIMENSION ENGRAVED IN HOUSING ON OUTPUT SIDE

J = MEASUREMENT WITH BEARING UNDER LOAD

MD = GEAR (175) MOUNTING DISTANCE (BASIC)1

TOL = +0.000/-0.003

SHIM (120) THICKNESS X_6 FOR ASSEMBLIES USING GEAR (175)



SHIMMING CALCULATION

$X_7 = J2 - L + MD - G + TOL1$

WHERE: J2 = MEASUREMENT WITH BEARING UNDER LOAD (EQUALS $J + X_6$)

L = MEASUREMENT ON GEAR (165)

G = DIMENSION ENGRAVED IN HOUSING ON INPUT SIDE

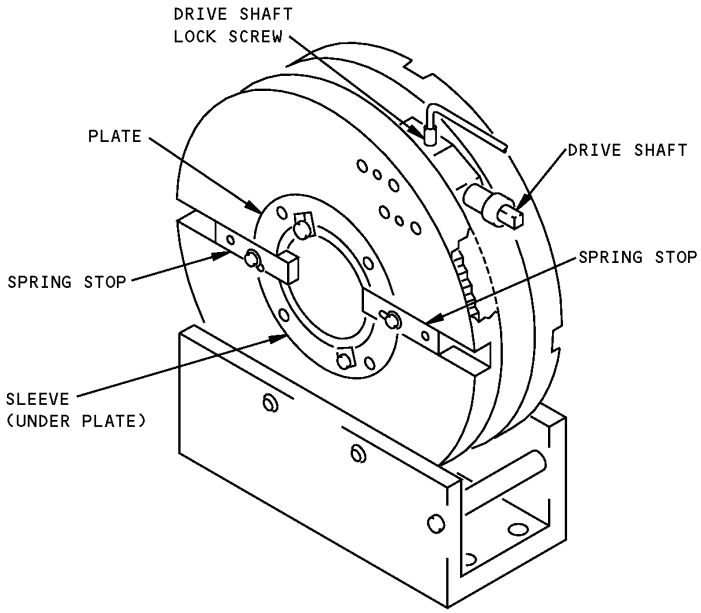
MD = GEAR (165) MOUNTING DISTANCE (BASIC)

TOL = +0.000/-0.003

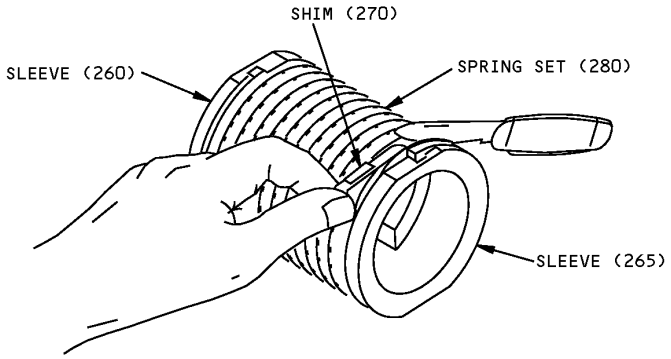
SHIM (170) THICKNESS X_7 FOR ASSEMBLIES USING GEAR (175)

ALL DIMENSIONS ARE IN INCHES

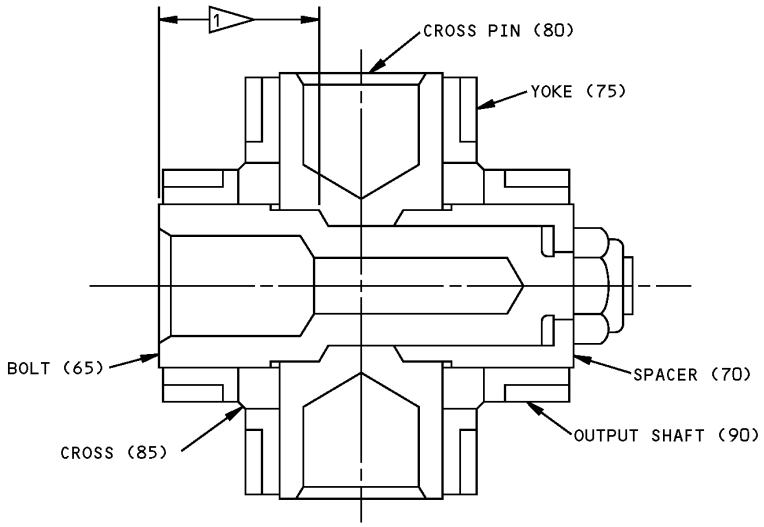
Shimming Diagrams
Figure 701 (Sheet 4 of 4)



Spring Expansion Fixture, ST6107
Figure 702



Spring Pack Shim Installation
Figure 703



Universal Joint Assembly
Figure 704

4. Storage

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00070	Fluid - Hydraulic, Petroleum Base	MIL-PRF-5606 (Replaces MIL-H-5606)

B. References

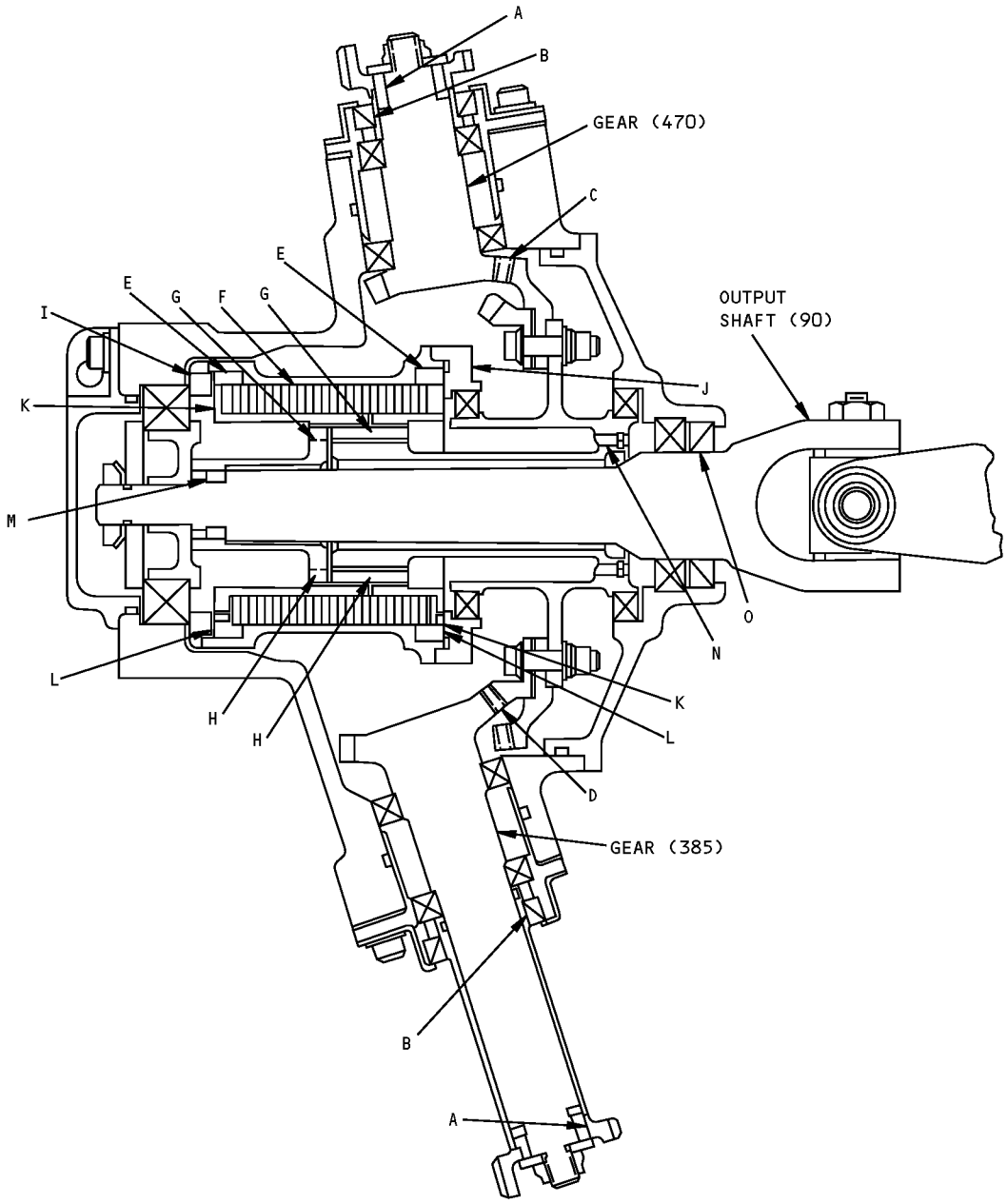
Reference	Title
SOPM 20-44-02	TEMPORARY PROTECTIVE COATINGS

C. Procedure

(1) Check that unit is filled to proper level with hydraulic fluid, D00070.

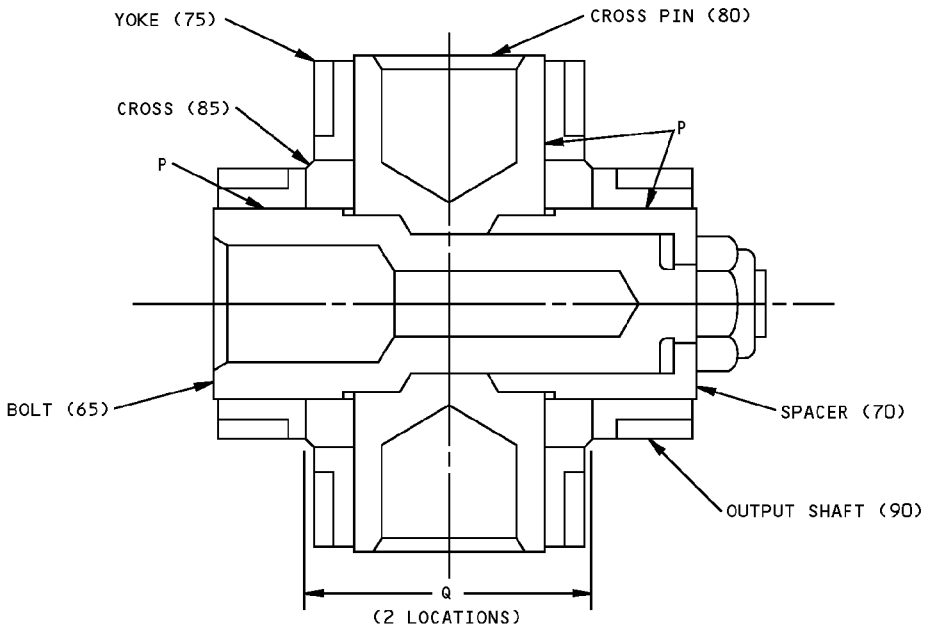
(2) Use standard industry practices and information in SOPM 20-44-02 to store this component.

FITS AND CLEARANCES



ITEM NUMBERS REFER TO IPL FIG. 1

Fits and Clearances
Figure 801 (Sheet 1 of 3)



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	315,400 *[1] 385,470			0.0000	0.0108			0.0187
B	OD 340,425	1.126	1.128			1.122		
C	470 *[2] 165,190			0.0009	0.0038			0.0057
D	385 *[2] 175,200			0.0007	0.0030			0.0045
E	ID 285 OD 255	3.524 3.514	3.525 3.515	0.009	0.011	3.513	3.526	0.013
F	ID 285 OD 280	3.0966 3.0070	3.0971 3.0080	0.0886	0.0901	3.0065	3.0976	0.0911
G	*[3]260,265	0.883	0.887			0.875		
H	*[4]235,275	0.645	0.649			0.637		

Fits and Clearances
Figure 801 (Sheet 2 of 3)

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	
I	*[5]245	0.299	0.301			0.297		
J	*[5]240	0.182	0.185				0.187	
K	*[6]260,265	0.234	0.239			0.232		
L	*[5]255	0.374	0.375			0.372		
M	*[7]90,275			0.0015	0.0068			0.0090
N	175,185 *[7] 235			0.0015	0.0073			0.0090
O	OD 90	1.3769	1.3774			1.3720		
P	ID 95 OD 65,70,80	0.8340 0.8313	0.8360 0.8320	0.0020	0.0047	0.8303	0.8423	0.0120
Q	*[5]85	1.2539	1.2550			1.2500		

*[1] SPLINE BACKLASH MEASURED AT 1.6875 SPLINE PITCH DIA ON COUPLING (315,400) WITH GEAR (385,470) FIXED

*[2] GEAR BACKLASH MEASURED AT 0.8125 SPLINE PITCH DIA ON GEAR (385,470), WITH MATING GEAR (165,175, 190,200) FIXED BY LOCKING OUTPUT SHAFT (90) AND APPLYING 20 LB-IN. TORQUE TO OPPOSITE BEVEL GEAR

*[3] CIRCULAR TOOTH THICKNESS MEASURED AT 1.9375 PITCH DIA

*[4] CHORDAL TOOTH THICKNESS MEASURED AT 1.9375 PITCH DIA

*[5] WIDTH

*[6] FLANGE THICKNESS

*[7] SPLINE BACKLASH MEASURED AT 0.8125 PITCH DIA ON SHAFT (90) WITH ADAPTER (275) FIXED

*[8] SPLINE BACKLASH MEASURED AT 1.625 PITCH DIA ON GEAR (175) OR DRIVER (185) WITH COUPLING (235) FIXED

ALL DIMENSIONS ARE IN INCHES

Fits and Clearances
Figure 801 (Sheet 3 of 3)

FOR TORQUE VALUES OF STANDARD FASTENERS, REFER TO 20-50-01			
ITEM NO. IPL FIG. 1	NAME	TORQUE	
		POUND-INCHES	POUND-FEET
20,100,320,405	BOLT	80-100	
40	NUT	200-240	
60	NUT	170-200	
150	NUT	90-125	
210	NUT	180-250	
305,390	NUT	160-190	

Torque Table
Figure 802

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

1. General

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

NOTE: Equivalent substitutes may be used.

Special Tools

Reference	Description	Part Number	Supplier
SPL-5415	Splined Coupling Spanner Wrench	F71228-500	81205
SPL-5446	X-Y recorder	RW20IT Opt: 7046A Opt: 7090A	31991 28480 28480
SPL-5448	Strain gage conditioner	3170	02654
SPL-5449	Strain gage conditioner	3270	02654
SPL-5462	Adapter - Torque Wrench	ST6105-3	71791
SPL-5463	Spring Expansion Fixture	ST6107	71791
SPL-5464	Transmission tester	ST6396	71791

Tool Supplier Information

CAGE Code	Supplier Name	Supplier Address
02654	DAYTRONIC CORP.	2589 CORPORATE PL. MIAMISBURG, OH 45342-3655 Telephone: (513) 866-3300 Facsimile: (813) 866-3327
28480	HEWLETT-PACKARD COMPANY	1421 S. MANHATTAN AVE. FULLERTON, CA 92831 Telephone: 714-758-5805 Facsimile: 714-758-7537
31991	SOLTEC CORP	12977 ARROYO ST SAN FERNANDO, CA 91340-1597 Telephone: (818) 365-0800 Facsimile: (818) 365-7839

Tool Supplier Information (Continued)

CAGE Code	Supplier Name	Supplier Address
71791	CURTISS-WRIGHT CONTROLS INC.	A5800 JOHN J. DELANEY DRIVE GASTONIA, NC 28277 Telephone: 704-869-4600 Facsimile: 704-869-4601 www.cwcontrols.com
81205	THE BOEING COMPANY	17930 INTERNATIONAL BLVD. SOUTH SEATAC, WA 98188-4321 Telephone: 206-662-6650 Facsimile: 206-662-7145

ILLUSTRATED PARTS LIST

1. Introduction

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

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

1 2 3 4 5 6 7

. Assembly

. Attaching parts for assembly

. . Detail parts for assembly

. . Subassembly

. . Attaching parts for subassembly

. . . Detail parts for subassembly

. . . Sub-subassembly

. . . Attaching parts for subassembly

. . . . . Details parts for sub-subassembly

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

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

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

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

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

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

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

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

H. Interchangeable Parts

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

VENDOR CODES

Code	Name
02758	NETWORKS ELECTRONIC CORP U S BEARING DIV 9750 DE SOTO AVENUE CHATSWORTH, CALIFORNIA 91311-4409 FORMERLY U S BEARING DIV NETWORKS ELEC CORP
15860	NEW HAMPSHIRE BALL BEARINGS, INC ASTRO DIVISION 155 LEXINGTON AVENUE LACONIA, NEW HAMPSHIRE 03246-2937 FORMERLY ASTRO BEARING CORP, LOS ANGELES, CALIF.
21335	TIMKEN US CORPORATION DIV FAFNIR 336 MECHANIC STREET LEBANON, NH 03766-0267 FORMERLY FAFNIR BRG AND TEXTRON INC FAFNIR DIV IN NEW BRITAIN, CONNECTICUT ; FORMERLY TORRINGTON CO THE SPECIAL PRODUCTS DIV SUB OF THE INGERSOLL-RAND CO V8D210 FORMERLY TORRINGTON CO FAFNIR BEARING DIV IN TORRINGTON, CT
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

Code	Name
50294	NEW HAMPSHIRE BALL BEARINGS, INC PRECISION DIVISION 9700 INDEPENDENCE AVENUE CHATSWORTH, CALIFORNIA 91311 FORMERLY NIPPON MINATURE BEARING CORP V23589 AND NMB AMERICA INC AND NMB INC
52676	SKF INDUSTRIES INC 1100 FIRST AVENUE KING OF PRUSSIA, PENNSYLVANIA 19406-1312 FORMERLY SKF INDUSTRIES INC FRANDFORD PLANT FORMERLY ATLAS BALL DIV OF SKF IND V70648 AND VB0017 FORMERLY IN PHILADELPHIA, PENNSYLVANIA
71791	CURTISS WRIGHT FLIGHT SYSTEMS INC 300 FAIRFIELD ROAD FAIRFIELD, NEW JERSEY 07006-1932 FORMERLY CURTISS-WRIGHT CORP CURTISS DIV IN CALDWELL N.J.
73680	GARLOCK INC MECHANICAL PACKING DIV SUB OF COLT IND 1666 DIVISION STREET PALMYRA, NEW YORK 14522-9343
80756	SPIROLOX DIV OF KAYDON CORP 29 CASSENS COURT FENTON, MISSOURI 63026-2543 FORMERLY RAMSEY CORP, TRW INC RAMSEY CORP IN MANCHESTER MO.
83259	PARKER-HANNIFIN CORP O-SEAL DIV 10567 JEFFERSON BLVD CULVER CITY, CALIFORNIA 90232-3513 FORMERLY PARKER SEAL CO DIV OF PARKER-HANNIFIN CORP

NUMERICAL INDEX

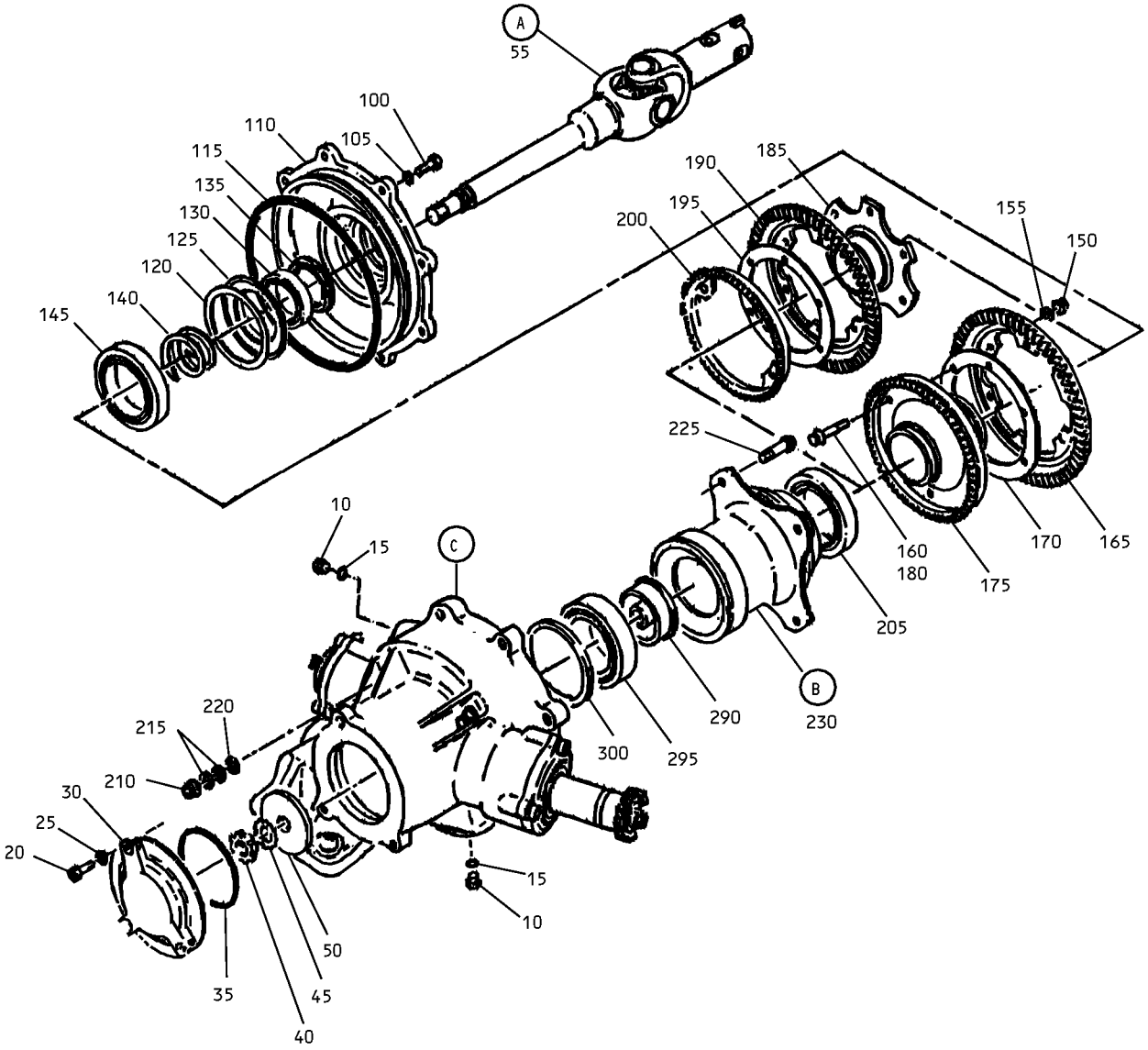
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
10-61899-15		1	95	4
111GE		1	145	1
		1	205	1
175827		1	275	1
176278X		1	270	AR
176643-3		1	255	2
176652		1	265	1
176653		1	260	1
176654		1	235	1
176655		1	285	1
176657		1	240	1
176660		1	245	1
176661-2		1	280	1
176663-2		1	250	1
176667-2		1	230	1
2-164N304-75		1	115	1
21959-0351		1	335A	1
		1	420A	1
21959-0535		1	135A	1
600-001-5/16		1	220	4
65-50263-7		1	485	1
65-50263-8		1	490	1
65-50266-2		1	110	1
65-50272-1		1	185A	1
65-50272-2		1	185	1
65-50309-7		1	475	1
65-50309-8		1	480	1
65-50313-1		1	175A	1
65-50313-2		1	175	1
65-76603-5		1	55	1
65-76607-1		1	65	1
65-76607-2		1	65A	1
65C25532-2		1	315	1
65C27503-1		1	1	RF

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
65C27503-2		1	1A	RF
65C27503-3		1	1B	RF
65C27506-1		1	5	RF
65C27506-2		1	5A	RF
65C27506-3		1	5B	RF
66-23902-1		1	290B	1
66-23913-1		1	50B	1
66-23945-1		1	170	1
		1	195	1
66-24715-1		1	310	1
		1	395	1
69-37607-1		1	190A	1
69-37607-2		1	190	1
69-37608-1		1	200A	1
69-37608-2		1	200	1
69-37694-1		1	30	1
69-52407-1		1	90B	1
69-52407-2		1	90A	1
69-52407-3		1	90	1
69-52412-2		1	470A	1
69-52412-3		1	470	1
69-52417-2		1	385B	1
69-52417-3		1	385A	1
69-52417-4		1	385	1
69-52420-3		1	75B	1
69-52420-5		1	75A	1
69-52420-7		1	75	1
69-52427-2		1	400	1
69-52434-1		1	50A	1
69-52434-2		1	50	1
69-52435-1		1	40	1
69-52437-1		1	290A	1
69-52437-2		1	290	1
69-52439-1		1	355	1
		1	440	1

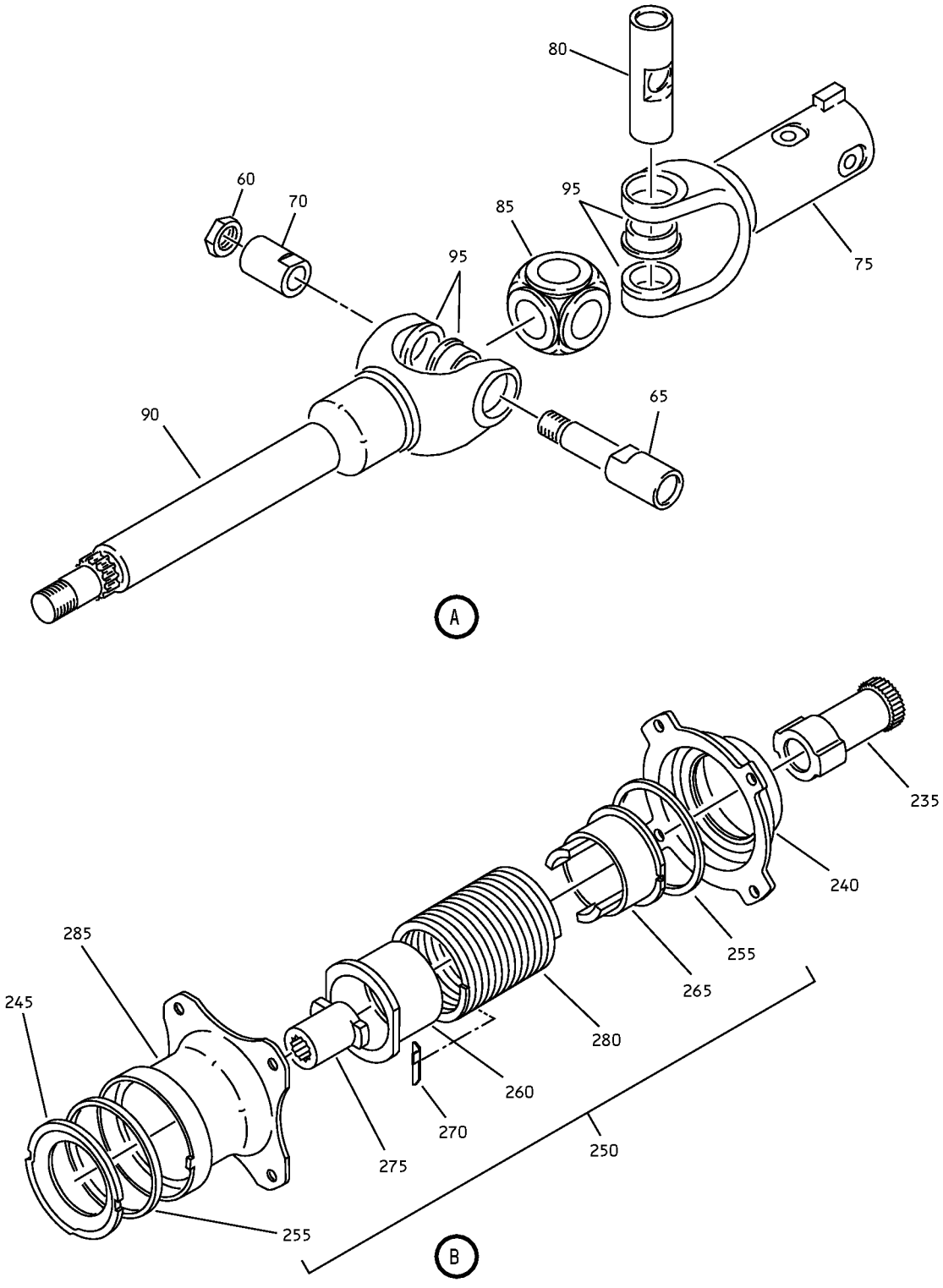
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
69-52441-1		1	495	4
69-52448-1		1	125	1
69-52450-1		1	120	1
69-52453-1		1	300	1
69-52453-2		1	300A	1
69-52461-1		1	505	1
69-52466-1		1	165B	1
69-52466-2		1	165A	1
69-52466-3		1	165	1
69-52468-1		1	365	1
		1	450	1
69-52469-1		1	350	1
		1	435	1
69-52470-1		1	330	1
		1	415	1
69-52473-1		1	425	1
69-52474-1		1	340	1
69-60053-1		1	70A	1
69-60053-2		1	70	1
69-60057-1		1	80A	1
69-60057-2		1	80	1
69-60059-1		1	85	1
69-73393-3		1	335	1
		1	420	1
69-73393-4		1	135	1
69-87878-1		1	64	1
7100-5/16		1	220A	4
9110HK1		1	295	1
		1	295A	1
AFDU13-9-15		1	95	4
AJF13A104DU		1	95	4
AN960-416		1	25	3
		1	105	8
		1	325	3
		1	410	3

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
BACB10A474		1	295C	1
BACB10BA50		1	295B	1
BACB10BB25		1	370	1
		1	455	1
BACB10BB35		1	130	1
BACB30MT4T5		1	160	6
BACB30MT4T8		1	180	6
BACB30MT5T14		1	225	4
BACB30US4K5		1	160A	6
BACB30US4K8		1	180A	6
BACB30US5K14		1	225A	4
BACN10HR4		1	150	6
BACN10HR5		1	210	4
BACN10JC7		1	60	1
BACN11N107CD		1	60A	1
BACP18BBC03A10P		1	61	1
BACS11W5		1	220B	4
BACW10BN5P		1	215	8
BACW10BP4P		1	155	6
HDB006P3		1	380A	1
		1	465A	1
HDB006P5		1	380	1
		1	465	1
HDF007-9		1	130A	1
HJF13DU102		1	95	4
MS172272		1	45	1
MS172322		1	40A	1
MS21042L6		1	305	1
		1	390	1
MS21208F4-15		1	500	17
MS24391D4L		1	10	2
MS28775-021		1	345	1
		1	430	1
MS28775-133		1	360	1
		1	445	1

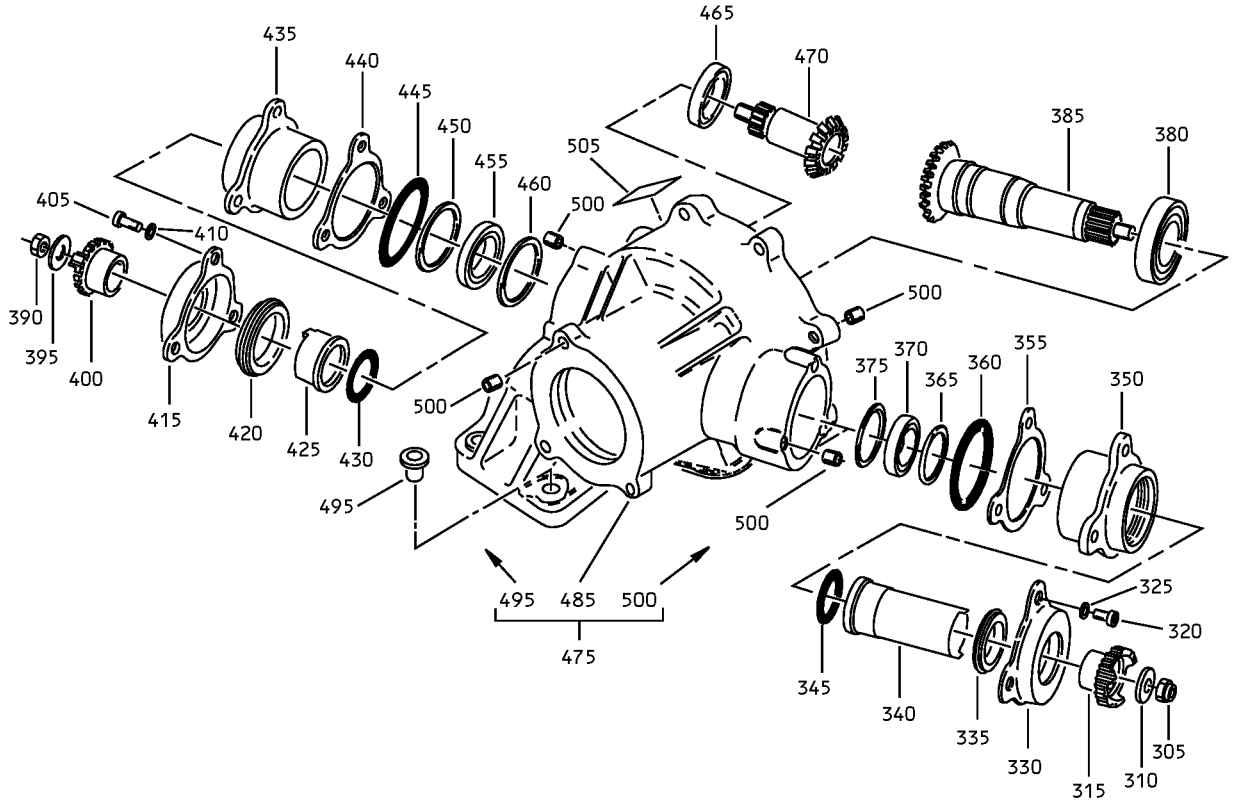
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
MS28775-147		1	35	1
MS28778-4		1	15	2
NAS1149E0732P		1	68	1
NAS1149E0763P		1	67	1
NAS1351-4H12P		1	20	3
		1	320	3
		1	405	3
NAS1523-5Y		1	220C	4
NAS6604H5		1	100	8
RR165		1	140	1
RRN165		1	375	1
		1	460	1
SKF6907		1	130B	1



Trailing Edge Flap Drive System No. 3 and 6 Transmission Assemblies
IPL Figure 1 (Sheet 1 of 3)



Trailing Edge Flap Drive System No. 3 and 6 Transmission Assemblies
IPL Figure 1 (Sheet 2 of 3)



Trailing Edge Flap Drive System No. 3 and 6 Transmission Assemblies
IPL Figure 1 (Sheet 3 of 3)

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1	65C27503-1		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 3	A	RF
–1A	65C27503-2		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 3	B	RF
–1B	65C27503-3		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 3	E	RF
–5	65C27506-1		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 6	C	RF
–5A	65C27506-2		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 6	D	RF
–5B	65C27506-3		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 6	F	RF
10	MS24391D4L		. PLUG		2
15	MS28778-4		. PACKING		2
20	NAS1351-4H12P		. BOLT		3
25	AN960-416		. WASHER		3
30	69-37694-1		. COVER		1
35	MS28775-147		. PACKING		1
40	69-52435-1		. NUT (OPT ITEM 40A)		1
–40A	MS172322		. NUT (OPT ITEM 40)		1
45	MS172272		. WASHER		1
50	69-52434-2		. WASHER (OPT ITEM 50A, 50B)		1
–50A	69-52434-1		. WASHER (OPT ITEM 50, 50B)		1
–50B	66-23913-1		. WASHER (OPT ITEM 50, 50A)		1
55	65-76603-5		. UNIVERSAL JOINT ASSY		1
60	BACN10JC7		. . NUT (PRE SB 737-27-1265)		1
60A	BACN11N107CD		. . CASTELLATED NUT (POST SB 737-27-1265)		1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
61	BACP18BB˜ C03A10P		. . COTTER PIN (POST SB 737-27-1265)		1
64	69-87878-1		. . SHIM (POST SB 737-27-1265)		1
65	65-76607-1		. . BOLT (PRE SB 737-27-1265)		1
65A	65-76607-2		. . BOLT (POST SB 737-27-1265)		1
67	NAS1149E0763P		. . WASHER (POST SB 737-27-1265)		1
68	NAS1149E0732P		. . WASHER (POST SB 737-27-1265)		1
70	69-60053-2		. . SPACER (POST SB 737-27-1265)		1
–70A	69-60053-1		. . SPACER (PRE SB 737-27-1265)		1
75	69-52420-7		. . YOKE-BALLSCREW (OPT ITEM 75A, 75B)		1
–75A	69-52420-5		. . YOKE-BALLSCREW (OPT ITEM 75, 75B)		1
–75B	69-52420-3		. . YOKE-BALLSCREW (OPT ITEM 75, 75A)		1
80	69-60057-2		. . PIN-CROSS (OPT ITEM 80A)		1
–80A	69-60057-1		. . PIN-CROSS (OPT ITEM 80)		1
85	69-60059-1		. . CROSS-TRUNNION		1
90	69-52407-3		. . SHAFT-OUTPUT (OPT ITEM 90A, 90B)		1
–90A	69-52407-2		. . SHAFT-OUTPUT (OPT ITEM 90, 90B)		1
–90B	69-52407-1		. . SHAFT-OUTPUT (OPT ITEM 90, 90A)		1
95	AFDU13-9-15		. . BUSHING (V15860) (SPEC 10-61899-15) (OPT AJF13A104DU (V50294)) (OPT HJF13DU102 (V02758))		4

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
100	NAS6604H5		. BOLT		8
105	AN960-416		. WASHER		8
110	65-50266-2		. COVER		1
115	2-164N304-75		. PACKING (V83259)		1
120	69-52450-1		. SHIM		1
125	69-52448-1		. SPACER		1
130	BACB10BB35		. BEARING (OPT ITEM 130A, 130B)		1
–130A	HDF007-9		. BEARING (V40920) (OPT ITEM 130, 130B)		1
–130B	SKF6907		. BEARING (V52676) (OPT ITEM 130, 130A)		1
135	69-73393-4		. SEAL		1
–135A	21959-0535		. SEAL (V73680) (REPLACED BY ITEM 135)	A, C	1
140	RR165		. RING (V80756)		1
145	111GE		. BEARING (V21335)		1
150	BACN10HR4		. NUT		6
155	BACW10BP4P		. WASHER		6
160	BACB30MT4T5		. BOLT (ITEMS 160 THRU 175 USED TOGETHER ARE OPT TO ITEMS 180 THRU 200)	A-D	6
–160A	BACB30US4K5		. BOLT (ITEMS 160 THRU 175 USED TOGETHER ARE OPT TO ITEMS 180 THRU 200)	E, F	6
165	69-52466-3		. GEAR (OPT ITEM 165A, 165B) (ITEMS 160 THRU 175 USED TOGETHER ARE OPT TO ITEMS 180 THRU 200)		1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–165A	69-52466-2		. GEAR (OPT ITEM 165, 165B) (ITEMS 160 THRU 175 USED TOGETHER ARE OPT TO ITEMS 180 THRU 200)		1
–165B	69-52466-1		. GEAR (OPT ITEM 165, 165A) (ITEMS 160 THRU 175 USED TOGETHER ARE OPT TO ITEMS 180 THRU 200)		1
170	66-23945-1		. SHIM (ITEMS 160 THRU 175 USED TOGETHER ARE OPT TO ITEMS 180 THRU 200)		1
175	65-50313-2		. GEAR (OPT ITEM 175A) (ITEMS 160 THRU 175 USED TOGETHER ARE OPT TO ITEMS 180 THRU 200)		1
–175A	65-50313-1		. GEAR (OPT ITEM 175) (ITEMS 160 THRU 175 USED TOGETHER ARE OPT TO ITEMS 180 THRU 200)		1
180	BACB30MT4T8		. BOLT (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)	A-D	6
–180A	BACB30US4K8		. BOLT (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)	E, F	6
185	65-50272-2		. DRIVER (OPT ITEM 185A) (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)		1
–185A	65-50272-1		. DRIVER (OPT ITEM 185) (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)		1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
190	69-37607-2		. GEAR (OPT ITEM 190A) (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)		1
–190A	69-37607-1		. GEAR (OPT ITEM 190) (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)		1
195	66-23945-1		. SHIM (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)		1
200	69-37608-2		. GEAR (OPT ITEM 200A) (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)		1
–200A	69-37608-1		. GEAR (OPT ITEM 200) (ITEMS 180 THRU 200 USED TOGETHER ARE OPT TO ITEMS 160 THRU 175)		1
205	111GE		. BEARING (V21335)		1
210	BACN10HR5		. NUT		4
215	BACW10BN5P		. WASHER		8
220	600-001-5/16		. SEAL (V83259) (OPT ITEM 220A, 220B, 220C)		4
–220A	7100-5/16		. SEAL (V83259) (OPT ITEM 220, 220B, 220C)		4
–220B	BACS11W5		. SEAL (OPT ITEM 220, 220A, 220C)		4
–220C	NAS1523-5Y		. SEAL (OPT ITEM 220, 220A, 220B)		4
225	BACB30MT5T14		. BOLT	A-D	4
–225A	BACB30US5K14		. BOLT	E, F	4

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
230	176667-2		. BRAKE ASSY-TORQUE (V71791)		1
235	176654		. . COUPLING		1
240	176657		. . SUPPORT		1
245	176660		. . SUPPORT		1
250	176663-2		. . PACK ASSY-SPRING		1
255	176643-3		. . . RING		2
260	176653		. . . SLEEVE		1
265	176652		. . . SLEEVE		1
270	176278X		. . . SHIM		AR
275	175827		. . . ADAPTER		1
280	176661-2		. . . SPRING SET		1
285	176655		. . HOUSING		1
290	69-52437-2		. ADAPTER (OPT ITEM 290A, 290B)		1
–290A	69-52437-1		. ADAPTER (OPT ITEM 290, 290B)		1
–290B	66-23902-1		. ADAPTER (OPT ITEM 290, 290A)		1
295	9110HK1		. BEARING (V38443)	A, C	1
–295A	9110HK1		. BEARING (V38443) (OPT ITEM 295B, 295C)	B, D, E, F	1
–295B	BACB10BA50		. BEARING (OPT ITEM 295A, 295C)	B, D, E, F	1
–295C	BACB10A474		. BEARING (OPT ITEM 295A, 295B)	B, D, E, F	1
300	69-52453-1		. SHIM (OPT ITEM 300A)		1
300A	69-52453-2		. SHIM (OPT ITEM 300)		1
305	MS21042L6		. NUT		1
310	66-24715-1		. WASHER		1
315	65C25532-2		. COUPLING		1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
320	NAS1351-4H12P		. BOLT		3
325	AN960-416		. WASHER		3
330	69-52470-1		. RETAINER		1
335	69-73393-3		. SEAL		1
–335A	21959-0351		. SEAL (V73680) (REPLACED BY ITEM 335)	A, C	1
340	69-52474-1		. SLEEVE		1
345	MS28775-021		. PACKING		1
350	69-52469-1		. RETAINER		1
355	69-52439-1		. SHIM		1
360	MS28775-133		. PACKING		1
365	69-52468-1		. SHIM		1
370	BACB10BB25		. BEARING		1
375	RRN165		. RING (V80756)		1
380	HDB006P5		. BEARING (V40920) (OPT ITEM 380A)		1
–380A	HDB006P3		. BEARING (V40920) (OPT ITEM 380)		1
385	69-52417-4		. GEAR (OPT ITEM 385A, 385B)		1
–385A	69-52417-3		. GEAR (OPT ITEM 385, 385B)		1
–385B	69-52417-2		. GEAR (OPT ITEM 385, 385A)		1
390	MS21042L6		. NUT		1
395	66-24715-1		. WASHER		1
400	69-52427-2		. COUPLING		1
405	NAS1351-4H12P		. BOLT		3
410	AN960-416		. WASHER		3
415	69-52470-1		. RETAINER		1
420	69-73393-3		. SEAL		1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–420A	21959-0351		. SEAL (V73680) (REPLACED BY ITEM 420)	A, C	1
425	69-52473-1		. SLEEVE		1
430	MS28775-021		. PACKING		1
435	69-52469-1		. RETAINER		1
440	69-52439-1		. SHIM		1
445	MS28775-133		. PACKING		1
450	69-52468-1		. SHIM		1
455	BACB10BB25		. BEARING		1
460	RRN165		. RING (V80756)		1
465	HDB006P5		. BEARING (V40920) (OPT ITEM 465A)		1
–465A	HDB006P3		. BEARING (V40920) (OPT ITEM 465)		1
470	69-52412-3		. GEAR (OPT ITEM 470A)		1
–470A	69-52412-2		. GEAR (OPT ITEM 470)		1
475	65-50309-7		. HOUSING ASSY	A, B, E	1
–480	65-50309-8		. HOUSING ASSY	C, D, F	1
485	65-50263-7		. . HOUSING	A, B, E	1
–490	65-50263-8		. . HOUSING	C, D, F	1
495	69-52441-1		. . BUSHING		4
500	MS21208F4-15		. . INSERT		17
505	69-52461-1		. NAMEPLATE		1

–Item not Illustrated