COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

TE FLAP DRIVE, NO. 2 AND 7 TRANSMISSION ASSEMBLY

PART NUMBER 65C27502–3, –4, –5, 65C27507–3, –4, –8

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COMPONENT MAINTENANCE MANUAL

Revision No. 26
Jul 01/2009

To: All holders of TE FLAP DRIVE, NO. 2 AND 7 TRANSMISSION ASSEMBLY 27-55-60.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

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

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

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

ATTENTION

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Location of Change	Description of Change
27-55-60 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.

COMPONENT MAINTENANCE MANUAL

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

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR 33310-3	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	
Number	Date	Date	Initials

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Temporary Revision		Inserted		Removed	
Number	Date	Date	Initials	Date	Initials

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 NO. 2 AND 7 TRANSMISSION ASSEMBLIES - DESCRIPTION AND OPERATION

1. Description and Operation

A. The trailing edge flap drive system No. 2 and 7 transmission assemblies each consist of five bevel gears, a no-back ratchet mechanism, 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 delivers flap drive torque to a ballscrew and nut assembly, and also transmits torque through to the No. 1 or 8 transmission assembly. The torque brake limits the torque applied to the ballscrew. The no-back prevents flap retraction due to external loads. The assemblies are located at the inboard ends of the outboard flaps.

2. Leading Particulars (Approximate)

A. Length – 20 in

B. Width – 10 in

C. Height – 12 in

D. Weight – 40 lb

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. 2 and No.7 transmission assemblies after a repair 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. Preparation for Test

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D50090	Hydraulic Fluid - Petroleum Base NATO H-515 PETROLEUM BASE AIRCRAFT HYDRAULIC FLUID	MIL-PRF-5606H (NATO H-515)

B. Procedure

(1) Ensure that test unit has been serviced with hydraulic fluid, D50090 per ASSEMBLY, Paragraph 3.D.(24).

3. Functional Test (IPL Figure 1)

NOTE: Conduct tests at room temperature.

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)
STD-5476	Air Valve Adapter

B. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
G50347	Lockwire - Nickel-copper, 0.032 inch diameter	NASM20995N˜ C32

C. References

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

D. Procedure

(1) Rotate input coupling (440) in each direction by hand. Check that gears and bearings are free running with no evidence of binding at any position.

NOTE: Mounting face of forward housing assembly (40, 45) defines input side of unit.

(2) Remove plug (515) and install Air Valve Adapter, STD-5476 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 Air Valve Adapter, STD-5476 and install plug with new packing (520). Lockwire plug per SOPM 20-50-02, double-twist method using lockwire, G50347.

(4) Rotate input bevel gear (475) 10 revolutions in each direction. Allow unit to stand for 8 hours. Check that there is no evidence of leakage.

(5) With output shaft (255) and output bevel gear (475) 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.

(7) Apply 45-55 lb tension load to output shaft (255), then reverse direction of load. Check that shaft axial free play is 0.011-0.016 in.

(8) Looking forward, apply a 50-lb compressive load to output shaft. Rotate shaft in counterclockwise direction and check that ratcheting sound is audible.

CAUTION: DO NOT EXCEED 2050 LB-IN. INPUT TORQUE OR DAMAGE TO UNIT MAY OCCUR.

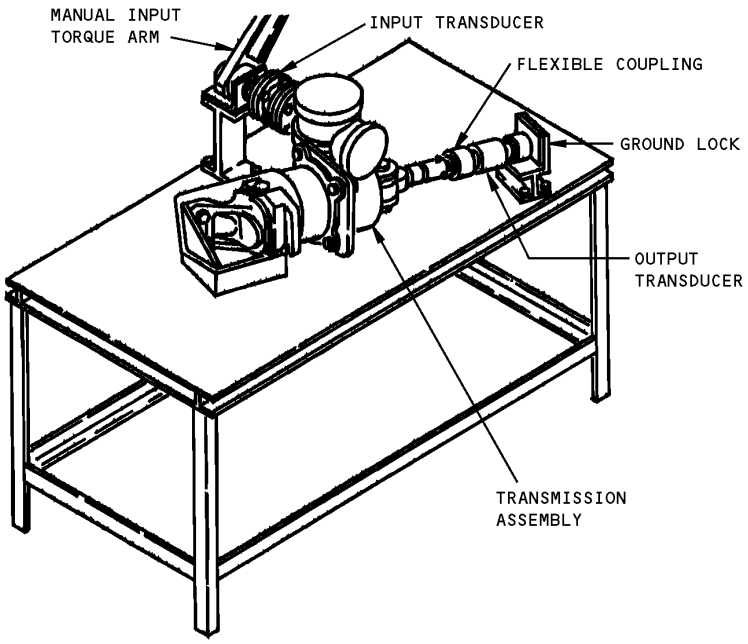
(9) Mount assembly in the transmission tester, SPL-5464 (TESTING AND FAULT ISOLATION, Figure 101). Connect input and output torque transducers and Strain gage conditioner, SPL-5448 or Strain gage conditioner, SPL-5449 to X-Y recorder, SPL-5446 and zero recorder.

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

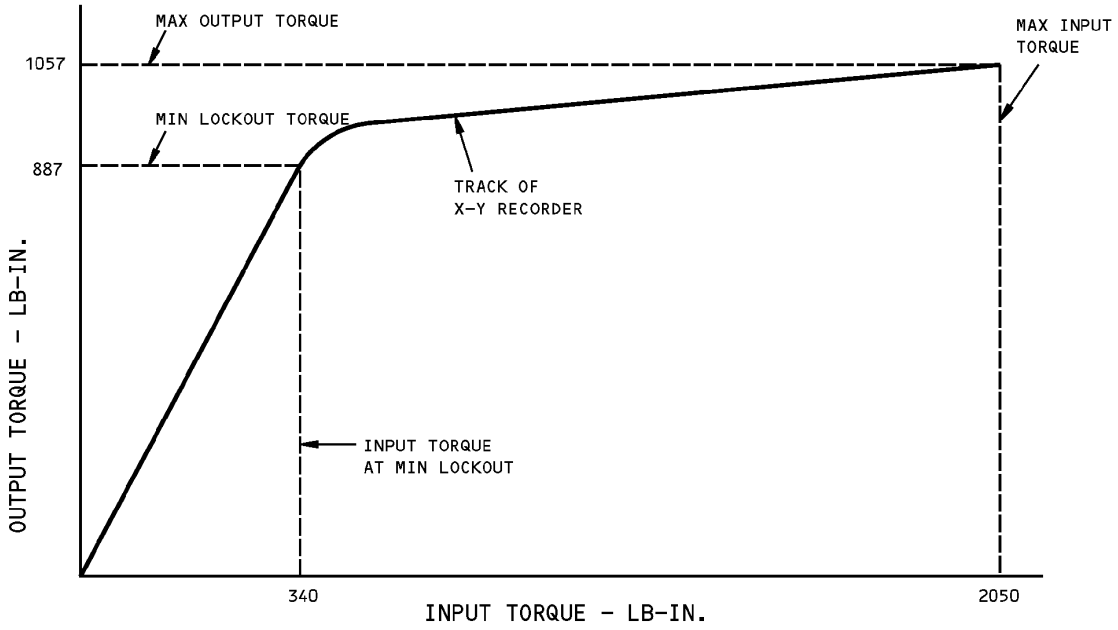
(10) Install manual input torque arm (TESTING AND FAULT ISOLATION, Figure 101) and apply slowly increasing clockwise torque to unit. Check that output torque at minimum lockout is not less than 887 lb-in. for input torque of 340 lb-in. Check that output torque does not exceed 1057 lb-in. at 2050 lb-in. input torque (TESTING AND FAULT ISOLATION, Figure 102).

(11) Repeat TESTING AND FAULT ISOLATION, Paragraph 3.D.(10) except in counterclockwise direction.

(12) Remove unit from the transmission tester, SPL-5464 and ink stamp "FT" followed by date of test completion on gear housing (560, 565) adjacent to identification nameplate (595).



Functional Test Set-up
Figure 101



Torque Brake Lockout Limits
Figure 102

4. **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 (180, 365,370,415,480,485,530, 540), gears (360,475,535, 555), or torque brake (285)	Replace parts as required.
	Improper shimming	*[1]
External leakage	Defective packings (85,115, 212,345,400,420,425,460,525) or seals (405,470)	Replace parts as required.
Backlash out of range	Improper shimming or worn components	*[1]
Lockout out of range	Defective torque brake assembly (285)	Repair or replace torque brake.
Axial free play out of range	Improper shimming	Replace shim (170) per ASSEMBLY.
	Worn bearing (180)	Replace bearing.

*[1] Do a check of the shims used to adjust the mounting of the gears and make corrections as necessary. If the check of shims shows that they are of the correct thickness, then do a check of the tooth contact patterns for each gear set. If necessary, refer to gear manufacturing industry standards for complete procedures on how to check the tooth contact pattern in bevel gear sets.

NOTE: A check of the tooth contact pattern in each gear set is not specified as part of the initial assembly procedure. This is because some disassembly of a completed unit is necessary to accomplish this check, and this adds time to the overall assembly procedure. Because a check of tooth contact pattern is not always necessary to make sure that gears are correctly assembled, this check is used only for trouble shooting/fault isolation procedures.

DISASSEMBLY

1. General

A. This procedure has the data necessary to disassemble the trailing edge flap drive system No. 2 and No.7 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. Parts Replacement (IPL Figure 1)

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

A. Packings (85, 115, 143, 212, 345, 400, 420, 425, 460, 520, 525, 590)

B. Washer (150)

C. Retaining ring (355)

D. Seals (405, 470)

3. 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-5461	Adapter - Torque Wrench (Part #: ST6105-1, Supplier: 71791)
SPL-5463	Spring Expansion Fixture (Part #: ST6107, Supplier: 71791)

B. Procedure

(1) Remove all lockwire.

(2) Remove plugs (142, 515, 585) and packings (143, 520, 590). Drain hydraulic fluid from assembly.

(3) Remove and disassemble forward housing assembly (40 or 45) and associated parts.

(a) Remove parts (70 thru 90) from housing assembly (40 or 45). Remove packings (85) from retainers (80).

(b) Remove parts (10 thru 35) and separate housing assembly from torque brake assembly (285).

NOTE: Do not remove inserts (50, 55) from housing assembly unless necessary for repair or replacement.

(c) Remove parts (95 thru 115) then remove pawl assemblies (125) and washers (120). Remove packings (115) from pins (110).

NOTE: Do not remove guides (130) or bearings (135) from pawl assemblies unless necessary for repair or replacement.

(4) Remove and disassemble no-back ratchet mechanism.

(a) Straighten tangs of washer (150). Use the torque wrench adapter, SPL-5461 to loosen nut (145), then remove parts (145 thru 175) from end of output shaft (255). Note thickness of shim (170) to facilitate reassembly. Discard washer (150).

NOTE: Do not remove dowel (155) from race (160) unless necessary for repair or replacement.

(b) Remove and separate ratchet (185), bearings (180, 190), washer (195), and torque brake support (290). Remove packing (212) and shim (215) from support. Note thickness of shim to facilitate reassembly.

(c) Remove driver (200), bearing (205), and plate (210), then remove support (265).

(5) Remove and disassemble universal-joint assembly (220).

(a) Tap end of output shaft (255) and remove universal-joint assembly from housing assembly (560 or 565).

(b) Remove parts (225 thru 235) from universal-joint assembly, then separate yoke (240), pin (245), cross (250), and output shaft (255).

NOTE: Do not remove bushings (260) from yoke or shaft unless necessary for repair or replacement.

(6) Remove and disassemble torque brake assembly (285).

(a) Remove parts (270 thru 280) and separate torque brake assembly and housing assembly (560 or 565).

(b) Remove support (290, 295) from housing (335), then remove packing (283, 345) from support. Remove shim (350) and note thickness to facilitate reassembly.

(c) Support torque brake housing while providing clearance for internal parts. Apply pressure on sleeve (325) to press out spring pack assembly (300) from housing. Remove rings (305). Remove shims (310), 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.

(d) Disassemble spring pack assembly (300).

1) Install spring pack assembly in the ST6107 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.

3) Rotate drive shaft until stops contact ends of spring set (330). Continue to wind springs until adapter (315) is free. Remove adapter and sleeves (320, 325) from spring set.

CAUTION: SPRING SET (330) IS A MATCHED ASSEMBLY. DO NOT REPLACE OR REWORK SPRINGS INDIVIDUALLY OR UNIT MAY NOT FUNCTION PROPERLY.

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 bevel gear (360) with attached parts from housing assembly (560 or 565). Remove retaining ring (355) to separate coupling (340) from bevel gear. Remove bearings (365, 370).

NOTE: Coupling (340) is part of torque brake assembly (285).

(8) Remove bevel gears (475).

(a) Hold coupling (440) with F71228-500 Splined Coupling Spanner Wrench, SPL-5415 and loosen nut (430). Remove parts (430 thru 440).

(b) Remove parts (445, 450) and retainer (455) from housing assembly. Remove seal (470) and packing (460) from retainer.

(c) Remove shims (465) and note thickness to facilitate reassembly.

(d) Remove bevel gear (475), then remove bearings (480, 485) from gear shaft.

(9) Remove bevel gears (535, 555).

(a) Remove parts (490, 495) and cover assembly (500) from housing assembly. Remove packing (525) from cover.

NOTE: Do not remove tube (510) from cover assembly unless necessary for repair or replacement.

(b) Remove bevel gears (535, 555) with attached parts from housing assembly and separate parts (530 thru 555). Note thickness of shims (545, 550) to facilitate reassembly.

(10) Complete disassembly of gear housing assembly (560).

(a) Remove parts (375 thru 385) and remove retainer (390) and support (395) with associated parts.

(b) Remove retainer (390) and parts (405 thru 415, 425) from support (395).

(c) Remove packings (400, 420) from gear housing assembly.

NOTE: Do not remove inserts (570) or nameplate (595) from gear 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. 2 and No.7 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 (180, 365, 370, 415, 480, 485, 530, 540, 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) Check all parts for obvious defects in accordance with standard industry practices.

(2) Magnetic particle check (SOPM 20-20-01) the following parts (IPL Figure 1)).

(a) Universal joint assembly: bolt (230), spacer (235), yoke (240), pin (245), cross (250), shaft (255)

(b) Pin (110), pawl (140)

(c) Nut (145), race (160), retainer (175), ratchet (185), driver (200), plate (210)

(d) Torque brake assembly: ring (305), adapter (315), sleeve (320, 325), spring set (330), housing (335), coupling (340)

(e) Gear (360, 475, 535, 555)

(f) Coupling (340, 440)

(g) Support (265, 395)

(3) Penetrant check (SOPM 20-20-02) the following parts (IPL Figure 1).

(a) Housing (60, 65, 575, 580)

(b) Support (290, 295)

(c) Retainer (390, 455)

(d) Cover (505)

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

(5) Check spring (90, IPL Figure 1).

(a) Compress spring to 0.492-0.512 in. and check that load is 1.80-2.20 lb.

(b) Check that no permanent set results when spring is compressed to solid height (0.455 in. max).

REPAIR

1. Content

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

Table 601:

P/N	NAME	REPAIR
65-50274	HOUSING, GEAR	1-1
65C27509	UNIVERSAL JOINT	2-1
65C27510	SHAFT, OUTPUT	3-1
66-24736	PAWL	4-1
69-37685	COVER/TUBE	5-1
69-37696	RETAINER	6-1
69-52404	GEAR, BEVEL	7-1
69-52429	RETAINER	8-1
69-52433	DRIVER	9-1
69-52436	RACE, BEARING	10-1
69-52438	PLATE, THRUST	11-1
69-52440	RATCHET	12-1
69-62733	SUPPORT, BEARING	13-1
69-62757	RETAINER	14-1
69-73605	YOKE	15-1
69-73606	BOLT, UNIVERSAL JOINT	16-1
69-73607	PIN, CROSS	17-1
69-73608	SPACER, UNIVERSAL JOINT	18-1
69-73609	CROSS, TRUNNION	19-1
182592	BRAKE, TORQUE	20-1
69-52461	NAMEPLATE	21-1
- - -	MISC PARTS REFINISH	22-1

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 20-42-01 Low Hydrogen Embrittlement Cadmium Plating
- 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 20-44-02 Temporary Protective Coatings
- 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 – BMS 10-11, Type I primer, C00259

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

C. Enamel – BMS 10-60, BAC707 gray gloss coating, C00700

D. Enamel – BMS 10-60, Type I, black coating, C00032

E. Adhesive – Type 89 urethane adhesive, A50055

F. Adhesive – Eccobond 104 Eccobond 104 adhesive, A50104

G. Topcoating – Clear Skydrol-resistant, Type 41 coating, B00571

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

BOEING®

COMPONENT MAINTENANCE MANUAL

GEAR HOUSING ASSEMBLY - REPAIR 1-1

65-50274–11, –12

1. General

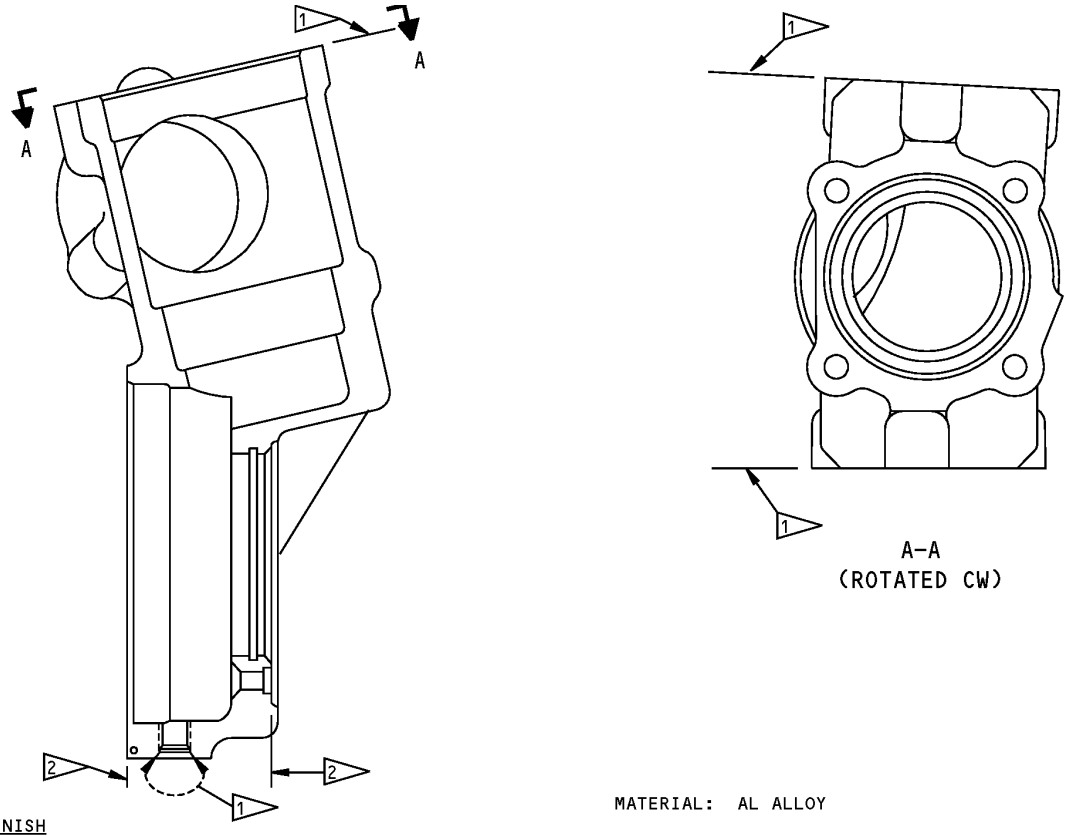
A. This procedure has the data necessary to repair the gear housing assembly.

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

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

2. Plating Repair

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



MATERIAL: AL ALLOY

REFINISH

HOUSING (575,580) -- SULFURIC ACID ANODIZE (F-17.03) OR CHROMIC ACID ANODIZE (F-17.02) ALL OVER. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (F-20.02) PLUS ONE COAT ENAMEL, BMS 10-11, TYPE 2, COLOR BAC707 GRAY GLOSS (SRF-12.63) ON ON ALL EXTERIOR SURFACES EXCEPT AS NOTED

1 NO PRIMER OR ENAMEL THESE SURFACES

2 NO ENAMEL THESE SURFACES

Gear Housing Refinish
Figure 601

UNIVERSAL JOINT ASSEMBLY - REPAIR 2-1

65C27509–2

1. General

A. This procedure has the data necessary to repair the universal joint assembly.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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 Repairs REPAIR 15-1 thru REPAIR 19-1.

2. Bushing Replacement

A. If installed bushings (260, IPL Figure 1) meet CHECK requirements and are not worn beyond service limits specified in FITS AND CLEARANCES, bushing 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 (240) or output shaft (255) per SOPM 20-50-03, using wet primer, C00259.

NOTE: Replace bushings in pairs.

OUTPUT SHAFT - REPAIR 3-1

65C27510–1, –2, –3

1. General

A. This procedure has the data necessary to repair the output shaft.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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 the 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 and Seal Surfaces, and Lug Hole Repairs (REPAIR 3-1, Figure 601)

A. Machine diameter as required, within repair limit shown, to remove defects.

B. Stress relieve by heating to 900-950°F for 2 hours (65C27510-2), or to 500-550°F for 4 hours (65C27510-1, -3), then air-cooling at 65-75°F. Magnetic particle check per SOPM 20-20-01.

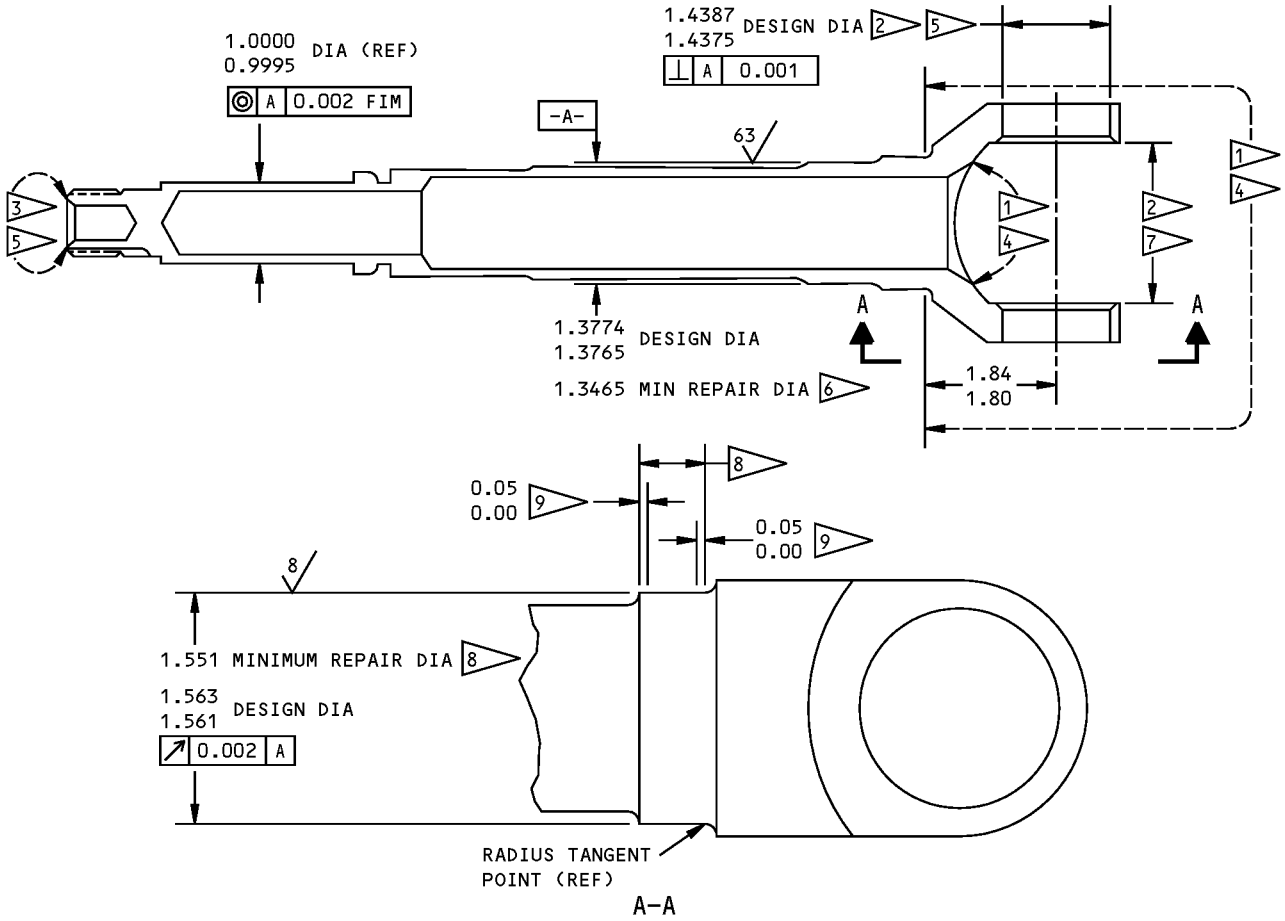
C. Shot peen as indicated per SOPM 20-10-03.

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

E. 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 3-1, Figure 601.



REFINISH

APPLY NO FINISH (F-25.01) TO ALL EXTERNAL SURFACES EXCEPT AS NOTED. CADMIUM-TITANIUM ALLOY PLATE (F-15.01), THROW-IN ALLOWED, PLUS ONE COAT OF BMS 10-11, TYPE I, PRIMER (F-20.02) PLUS BMS 10-60 BOEING COLOR 707 GRAY GLOSS ENAMEL (SRF-14.9813) ON INTERNAL SURFACES (-2 ONLY). CADMIUM-TITANIUM ALLOY PLATE (F-15.01), THROW-IN ALLOWED, PLUS TWO COATS BMS-10, TYPE I, PRIMER (F-20.03) ON INTERNAL SURFACES (-1 AND -3 ONLY)

1. CADMIUM-TITANIUM PLATE THESE SURFACES
2. PLATE 0.0003-0.0005 THICK
3. CADMIUM-TITANIUM PLATE THROW-IN ALLOWED
4. APPLY TWO COATS PRIMER
5. OMIT PRIMER AND ENAMEL

REPAIR

REF 6 8 9

BREAK SHARP EDGES 0.008 R

SHOT PEEN: 0.017-0.039 SHOT SIZE
0.016 A2 INTENSITY

MATERIAL: (65C27510-1,-3) 4340M STEEL
(275-300 KSI)
(65C27510-2) MOD H-11 STEEL
(RC 54-56)

ALL DIMENSIONS ARE IN INCHES

6. BUILD UP WITH CHROME PLATE (F-15.34) AND GRIND TO DESIGN DIMENSIONS AND FINISH SHOWN
7. OMIT ENAMEL (-2 ONLY)
8. CHROME PLATE (F-15.34). CAUTION - NO PLATING PERMITTED IN FILLET RADIUS
9. CHROME PLATE RUNOUT AREA

65C27510-1,-2,-3 Output Shaft Repair
Figure 601

PAWL ASSEMBLY - REPAIR 4-1

66-24736–2

1. General

A. This procedure has the data necessary to repair the pawl assembly.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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. Bearing Replacement (IPL Figure 1)

A. Remove worn bearing (135).

B. Install replacement bearing, making sure ends are flush with sides of pawl (140).

C. Machine bearing ID to 0.3125-0.3130 in.

3. Pawl Repair (IPL Figure 1

CAUTION: DO NOT GRIND BEYOND SERVICE WEAR LIMIT OR PAWL MAY NOT FUNCTION PROPERLY.

A. Grind worn or damaged tip per SOPM 20-10-01, as required to remove defects. Observe limit of 0.075 in. maximum allowable tip radius. Machine to 125 microinch surface finish.

COVER/TUBE ASSEMBLY - REPAIR 5-1

69-37685–4

1. General

A. This procedure has the data necessary to repair the cover/tube assembly.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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. Tube Replacement (IPL Figure 1)

A. Remove damaged or defective tube (510) from cover (505).

B. Clean and check condition of bore in cover.

C. Apply Eccobond 104 adhesive, A50104 to bore in cover and to OD of tube for distance of 0.37 in. from one end.

D. Insert coated end of tube into cover and remove excess adhesive.

E. Position assembly with tube pointing up, and cure adhesive for 6 hours at 250°F.

NOTE: Oven is to be at proper temperature before parts are assembled.

3. Refinish (IPL Figure 1)

A. Cover (505) – Sulfuric acid anodize (F-17.03) all over. Apply primer, C00259 (F-20.02) on exterior surfaces, except omit primer on machined face of filler port. Material: Aluminum alloy.

B. Tube (510) – Anodize per AMS 2470. Material: Aluminum alloy.

RETAINER - REPAIR 6-1

69-37696–4

1. General

A. This procedure has the data necessary to repair the retainer.

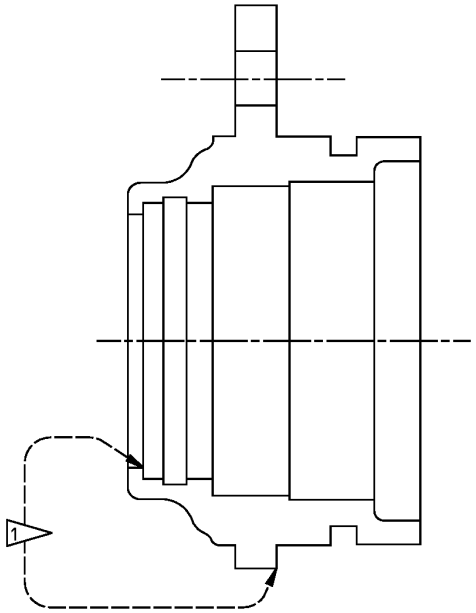
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the SOPM subjects identified in this procedure.

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 6-1, Figure 601.



REFINISH

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

MATERIAL: AL ALLOY

1 APPLY PRIMER THESE SURFACES ONLY

Retainer Refinish
Figure 601

BEVEL GEAR - REPAIR 7-1

69-52404–1, –2

1. General

A. This procedure has the data necessary to repair the bevel gear.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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. Sealing Surface Repair (REPAIR 7-1, Figure 601)

A. Magnetic particle examine per SOPM 20-20-01.

B. Machine gear OD as required, within repair limit, to remove defects. Finish should be 8 microinches or better. No step or mismatch is allowed.

C. Shot peen machined area (including fillet radius) using size and intensity specified per SOPM 20-10-03.

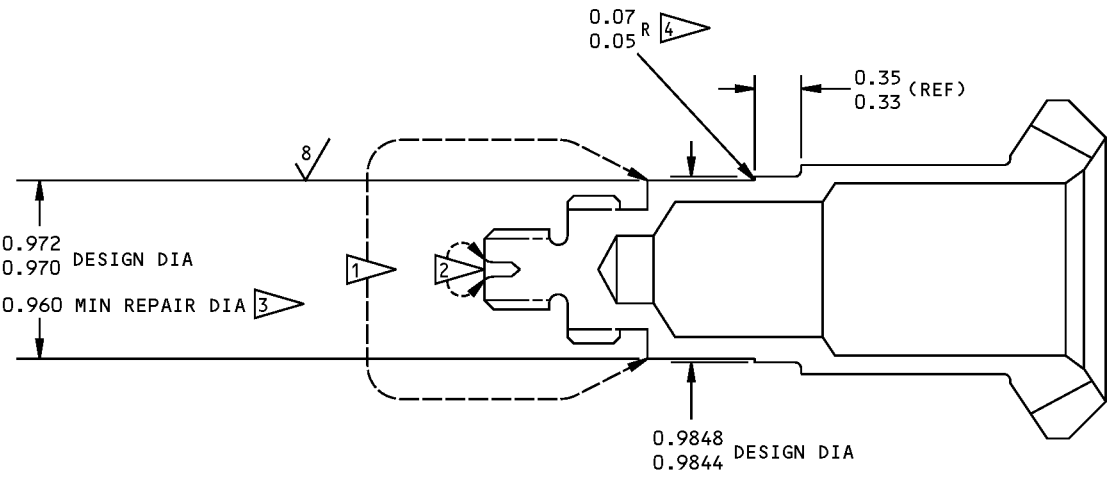
D. Build up OD with chrome plate per SOPM 20-42-03.

E. Grind OD (SOPM 20-10-04) to design diameter and finish noted.

F. Magnetic particle examine 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

CADMIUM-TITANIUM ALLOY PLATE AS NOTED. APPLY PRIMER TO DRILL CENTER AS NOTED

1 CADMIUM-TITANIUM ALLOY PLATE (F-1.181) 0.0005-0.0007 THICK THIS AREA

2 PLATING OPTIONAL THIS AREA. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (SRF-12.205)

3 BUILD UP WITH HARD CHROME PLATE (REF 20-42-03) AND GRIND TO FINISH AND DIMENSIONS SHOWN. STOP CHROME PLATE 0.03 MINIMUM BEFORE FILLET RADIUS

4 MAINTAIN RADIUS IN TRANSITION BETWEEN DIAMETERS

REPAIR

REF 3 4

BREAK SHARP EDGES 0.003-0.020

SHOT PEEN (REF 20-10-03)
0.017-0.033 SIZE
0.014 A2 INTENSITY
2.0 COVERAGE

MATERIAL: (69-52404-1) MOD H-11 STEEL (RC 54-56)
(69-52404-2) 4340M STEEL (270-300 KSI)

ALL DIMENSIONS ARE IN INCHES

69-52404-1,-2 Bevel Gear Repair
Figure 601

RETAINER - REPAIR 8-1

69-52429–1

1. General

A. This procedure has the data necessary to repair the retainer.

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

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

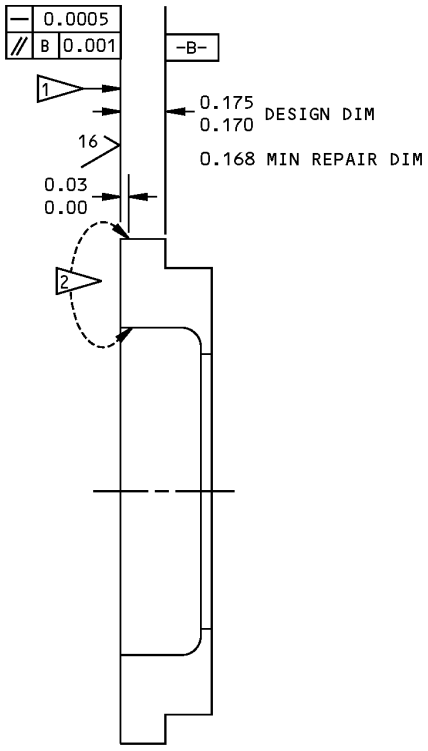
D. Refer to REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

E. Refer to IPL Figure 1 for item numbers.

2. Retainer Rework (REPAIR 8-1, Figure 601)

CAUTION: DO NOT GRIND BEYOND SERVICE WEAR LIMITS OR NO-BACK RATCHET MECHANISM MAY NOT OPERATE PROPERLY.

A. Grind worn or damaged thrust face of bearing retainer (175, IPL Figure 1), as required to remove defects. Observe 0.168 in. minimum dimension as shown. Machine to indicate surface finish.



REPAIR

1 GRIND THRUST FACE TO INDICATED FINISH. GRINDING BEYOND INDICATED LIMIT NOT PERMITTED

2 NITRIDE THIS AREA

MATERIAL: STEEL PER AMS 6470
CORE STRENGTH 135-175 KSI

NITRIDED 0.017-0.022 DEEP ON THRUST FACE AS NOTED, CASE HARDNESS 15N 93.5 MIN

BREAK SHARP EDGES 0.003-0.020

ALL DIMENSIONS ARE IN INCHES

69-52429-1 Retainer Repair
Figure 601

DRIVER - REPAIR 9-1

69-52433–1

1. General

A. This procedure has the data necessary to repair the driver.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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.

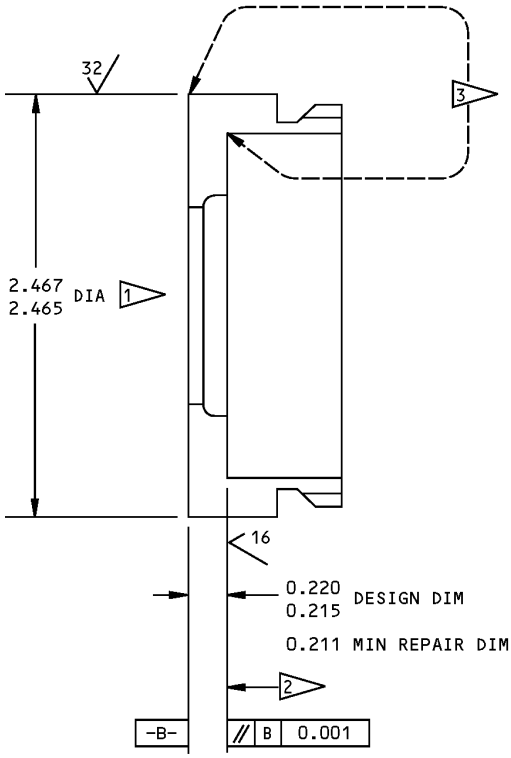
2. Driver Rework (REPAIR 9-1, Figure 601)

CAUTION: DO NOT GRIND BEYOND SERVICE WEAR LIMITS OR NO-BACK RATCHET MECHANISM MAY NOT OPERATE PROPERLY.

A. Grind worn or damaged thrust face of driver (200, IPL Figure 1), as required to remove defects. Observe 0.211 in. minimum dimension as shown. Machine to indicated surface finish.

3. Refinish

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 9-1, Figure 601.



REPAIR

SILVER PLATE PER AMS 2412, 0.0003-0.0005 THICK AS NOTED

1 PLATE THIS SURFACE ONLY

2 GRIND THRUST FACE TO INDICATED FINISH. GRINDING BEYOND INDICATED LIMIT NOT PERMITTED

3 NO NITRIDING THESE SURFACES

REPAIR

REF 2 3

MATERIAL: STEEL PER AMS 6470
CORE STRENGTH 135-175 KSI

NITRIDED 0.017-0.022 DEEP EXCEPT AS NOTED, CASE HARDNESS 15N 93.5 MIN

ALL DIMENSIONS ARE IN INCHES

69-52433-1 Driver Repair
Figure 601

BEARING RACE - REPAIR 10-1

69-52436–1

1. General

A. This procedure has the data necessary to repair the bearing race.

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

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

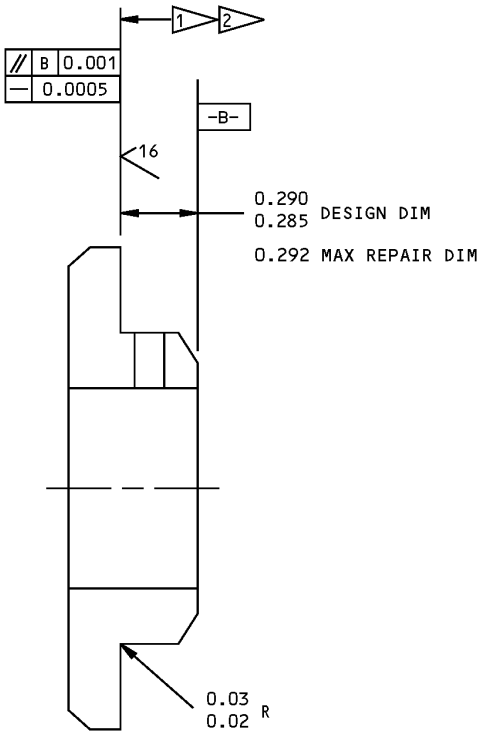
D. Refer to REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

E. Refer to IPL Figure 1 for item numbers.

2. Race Rework (REPAIR 10-1, Figure 601)

CAUTION: DO NOT GRIND BEYOND SERVICE WEAR LIMITS OR NO-BACK RATCHET MECHANISM MAY NOT OPERATE PROPERLY.

A. Grind worn or damaged thrust face of bearing race (160, IPL Figure 1), as required to remove defects. Observe 0.292 in. maximum dimension as shown. Machine to indicated surface finish.



REPAIR

1 GRIND THRUST FACE TO INDICATED FINISH. GRINDING BEYOND INDICATED LIMIT NOT PERMITTED

2 NITRIDE THIS SURFACE

MATERIAL: STEEL PER AMS 6470
CORE STRENGTH 135-175 KSI

NITRIDED 0.017-0.022 DEEP ON THRUST FACE AS NOTED, CASE HARDNESS 15N 93.5 MIN

BREAK SHARP EDGES 0.003-0.020

ALL DIMENSIONS ARE IN INCHES

69-52436-1 Bearing Race Repair
Figure 601

THRUST PLATE - REPAIR 11-1

69-52438–1

1. General

A. This procedure has the data necessary to repair the thrust plate.

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

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

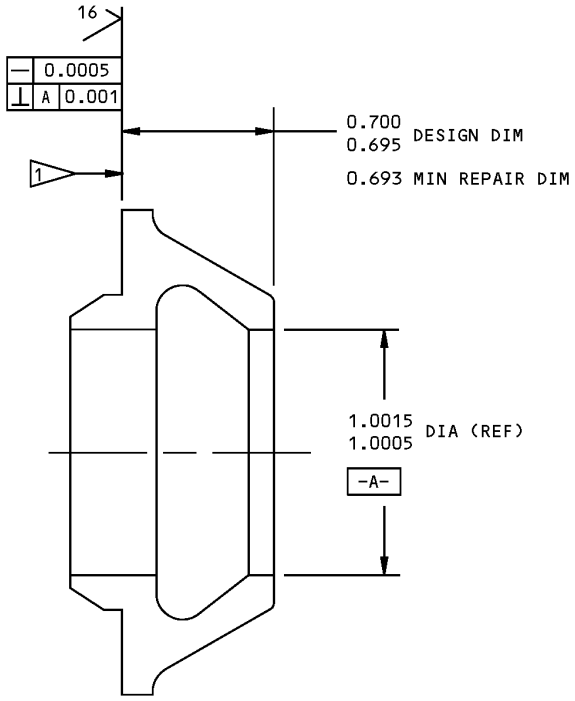
D. Refer to REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

E. Refer to IPL Figure 1 for item numbers.

2. Plate Rework (REPAIR 11-1, Figure 601)

CAUTION: DO NOT GRIND BEYOND SERVICE WEAR LIMITS OR NO-BACK RATCHET MECHANISM MAY NOT OPERATE PROPERLY.

A. Grind worn or damaged thrust face of plate (210, IPL Figure 1), as required to remove defects. Observe 0.693 in. minimum dimension as shown. Machine to indicated surface finish.



REPAIR

1 GRIND THRUST FACE TO INDICATED FINISH. GRINDING BEYOND INDICATED LIMIT NOT PERMITTED

MATERIAL: STEEL PER AMS 6470
CORE STRENGTH 135-175 KSI

NITRIDED 0.017-0.022 DEEP ON THRUST FACE, CASE HARDNESS 15N 93.5 MIN

ALL DIMENSIONS ARE IN INCHES

Thrust Plate Repair
Figure 601

RATCHET - REPAIR 12-1

69-52440–1, –2

1. General

A. This procedure has the data necessary to repair the bevel gear.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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. Ratchet Rework

CAUTION: DO NOT GRIND BEYOND SERVICE WEAR LIMITS OR RATCHET MAY NOT FUNCTION PROPERLY.

A. Grind worn or damaged teeth per SOPM 20-10-01, as required to remove defects. Observe limits of 3.075 in. minimum ratchet diameter and 0.225 in maximum tooth height. Machine to 125 microinch surface finish.

B. Grind thrust face per SOPM 20-10-01, as required to remove defects. Observe limit of 0.493 in. minimum width between bearing (180) seat and thrust face. Machine face to 32 microinch surface finish.

BEARING SUPPORT - REPAIR 13-1

69-62733–4, –5

1. General

A. This procedure has the data necessary to repair the bearing support.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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. Sealing Surface Repair (REPAIR 13-1, Figure 601)

A. Machine OD as required, within repair limit shown, to remove defects.

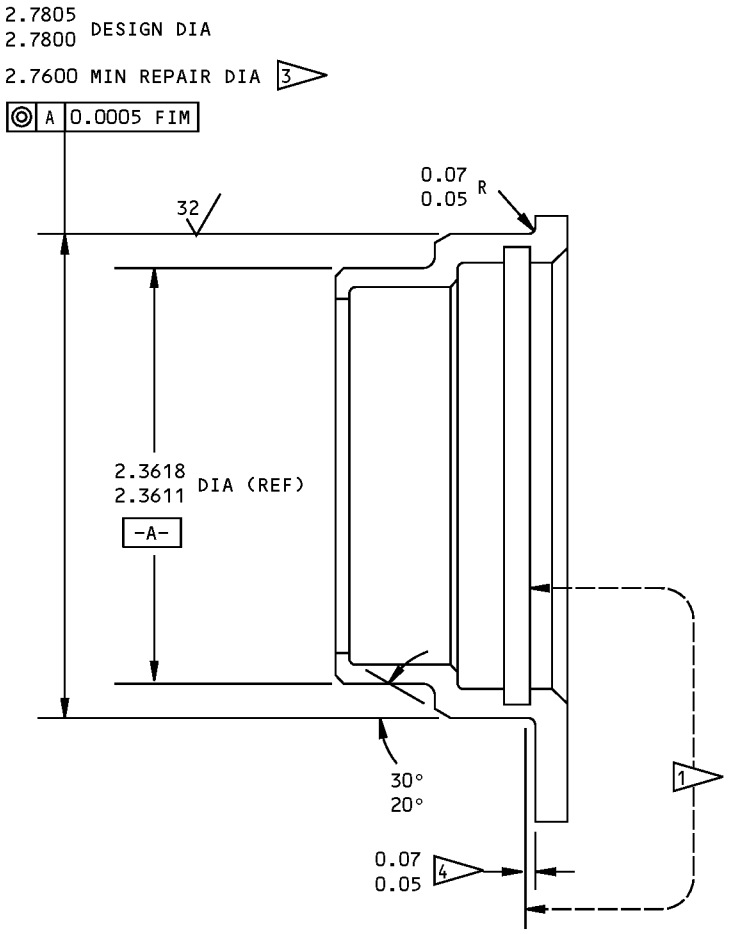
B. Stress relieve by heating to 900-950°F for 2 hours (69-62733-5) or to 500-550°F for 4 hours (69-62733-4) then air-cooling at 65-75°F. Magnetic particle check per SOPM 20-20-01.

C. Shot peen as indicated per SOPM 20-10-03.

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

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.



REFINISH

CADMIUM-TITANIUM ALLOY PLATE (F-15.01) ALL OVER. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (F-20.02) AS NOTED

1. APPLY PRIMER THESE SURFACES ONLY
2. DELETED
3. BUILD UP WITH CHROME PLATE AND GRIND TO DESIGN DIMENSIONS AND FINISH SHOWN, OBSERVE MINIMUM PLATING RUNOUT AT FILLET
4. NO CHROME THIS AREA

REPAIR

REF 3 4

125 ALL MACHINED SURFACES EXCEPT AS INDICATED

BREAK SHARP EDGES 0.003-0.020 R

SHOT PEEN: 0.017-0.039 SHOT SIZE
0.010 A2 INTENSITY

MATERIAL: (69-62733-4) 4340M STEEL
270-300 KSI
(69-62733-5) MOD H-11 STEEL
RC 54-56

ALL DIMENSIONS ARE IN INCHES

69-62733-4,-5 Bearing Support Repair
Figure 601

RETAINER - REPAIR 14-1

69-62757–3

1. General

A. This procedure has the data necessary to repair the bevel gear.

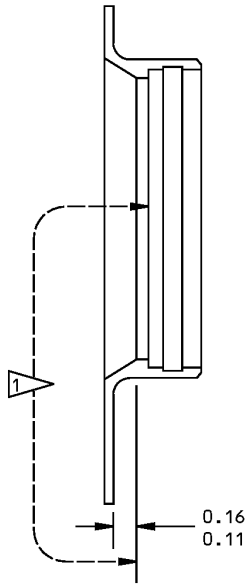
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the SOPM subjects identified in this procedure.

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 14-1, Figure 601.



REFINISH

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

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

1 APPLY PRIMER THESE SURFACES

2 (DELETED)

Retainer Refinish
Figure 601

YOKE - REPAIR 15-1

69-73605–1, –2, –3

1. General

A. This procedure has the data necessary to repair the yoke.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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. Machine attachment bolt holes to 0.3432-0.3442 in. dia per SOPM 20-10-02. Break sharp edges of reworked holes 0.003-0.020.

B. 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 (REPAIR 15-1, Figure 601)

A. Machine per SOPM 20-10-02 the yoke ID as required, within repair limit, to remove defects. Finish should be 32 microinches or better. No step or mismatch is allowed. Break sharp edges.

B. Surface temper etch with ammonium persulphate per SOPM 20-10-02.

C. Stress relieve at 350-400°F for 4 hours per SOPM 20-10-02.

D. Magnetic particle check per SOPM 20-20-01, Class B.

E. Shot peen machined area per SOPM 20-10-03. Observe material heat treat criteria specified.

F. Check if mating part (jackscrew) has been chrome plated. Use optional repair method for yoke if mating part has been chrome plated.

(1) Build up ID with chrome plate per SOPM 20-42-03. Chrome plate runout 0.01-0.03 inch around edges of ID and all holes.

(2) OPTIONAL REPAIR: Build up ID using electrodeposited nickel plate per SOPM 20-42-09, Type 3. Nickel plate runout 0.01-0.03 inch around edges of ID and all holes.

G. Stress relieve per SOPM 20-10-02 within 10 hours of plating. Stress relieve bake at 350-400°F for 12 hours per SOPM 20-10-02.

H. Grind yoke ID per SOPM 20-10-04 to design diameter shown. Surface finish to be 63 microinches or better.

I. Magnetic particle check per SOPM 20-20-01 class B.

J. Low hydrogen embrittlement sylus cad plate per SOPM 20-42-10 any unplated areas created due to chrome plate stops. Observe post plate bake requirements in SOPM 20-42-03.

4. Trunnion Hole Corrosion Removal (REPAIR 15-1, Figure 601)

A. Machine per SOPM 20-10-02 the trunnion hole as required to remove corrosion within maximum repair limit shown. Finish to 32 microinches. Break sharp edges.

NOTE: Remove only enough material that is necessary to remove corrosion.

B. Surface temper etch the machined area with ammonium persulphate per SOPM 20-10-02.

C. Stress relieve at 350-400°F for 4 hours per SOPM 20-10-02.

D. Magnetic particle check the machined area per SOPM 20-20-01, class B.

E. Shot peen the area shown using size, intensity and coverage specified per SOPM 20-10-03. Observe material heat treat criteria specified.

F. Build up the hole diameter with chrome plate per SOPM 20-42-03. Chrome plate runout 0.01-0.02 inch around edges of hole. Do not chrome plate chamferred area.

G. Stress relieve per SOPM 20-10-02 within 10 hours of plating. Stress relieve bake at 350-400°F for 12 hours per SOPM 20-10-02.

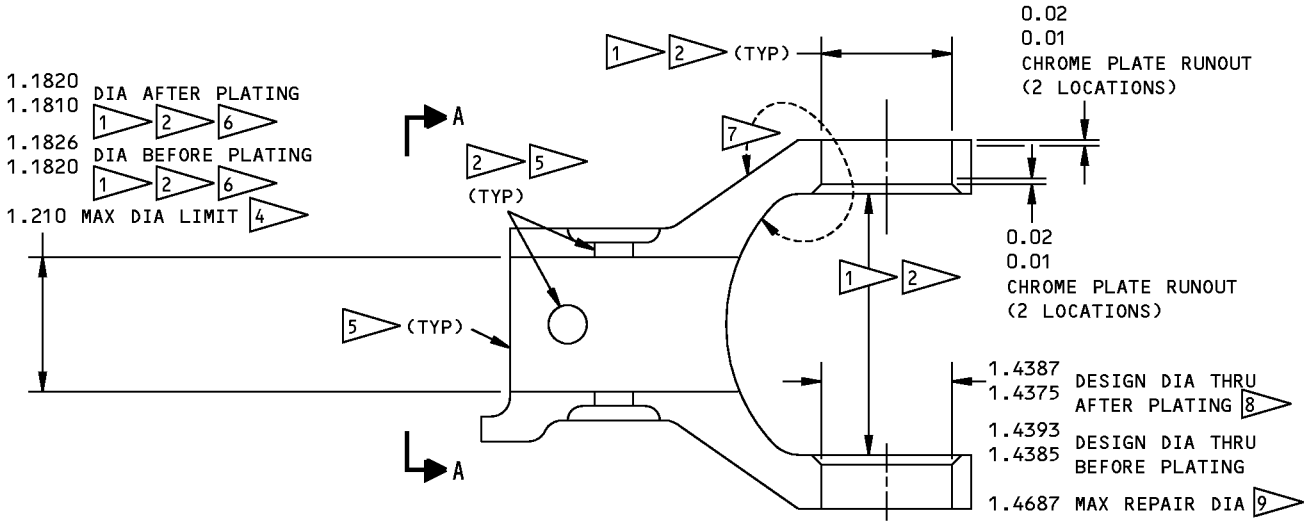
H. Grind hole ID per SOPM 20-10-04 to the after plating design diameter shown. Surface finish to be 63 microinches or better.

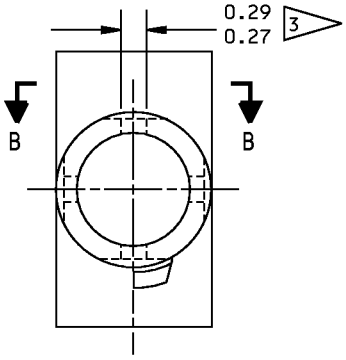
I. Magnetic particle check per SOPM 20-20-01 Class B.

J. Low Hydrogen embrittlement sytlus cad plate per SOPM 20-42-10 any unplated areas created due to chrome plate stops. Observe post plate bake requirements in SOPM 20-42-03 (section 7).

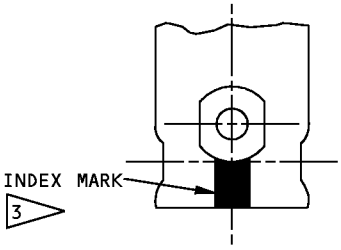
5. Refinish

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





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. CADMIUM–TITANIUM ALLOY PLATE 0.0003–0.0005 THICK
2. NO PRIMER THIS SURFACE
3. APPLY INDEX MARK PER 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
4. BUILD UP WITH HARD CHROME PLATE (SOMP 20–42–03) (OPTIONAL: ELECTRODEPOSITED NICKEL PLATE (SOPM 20–42–09))
5. PLATING RUNOUT IS 0.01–0.03 INCH AROUND EDGES OF ID AND ALL HOLES.
6. OMIT CADMIUM–TITANIUM PLATING IF THIS SURFACE IS REPAIRED.

REPAIR

REF 4 THRU 9

SHOT PEEN (SOPM 20–10–03)

MATERIAL: (69–73605–2) MOD H–11 STEEL (270–300 KSI)

(69–73605–1,–3) 4340M STEEL (270–300 KSI)

ALL DIMENSIONS ARE IN INCHES

7. SHOT PEEN AREA SHOWN ALL AROUND CIRCUMFERENCE OF HOLE (2 LOCATIONS)
8. NO CADMIUM–TITANIUM PLATING OR PRIMER ON THIS SURFACE
9. BUILD UP WITH HARD CHROME PLATE (SOPM 20–42–03)

128894 S0004993319_V2

69-73605-1,-2,-3 Yoke
Figure 601

UNIVERSAL JOINT BOLT - REPAIR 16-1

69-73606–1

1. General

A. This procedure has the data necessary to repair the universal joint bolt.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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 (REPAIR 16-1, Figure 601)

A. Machine diameter as required, within repair limit shown, to remove defects per SOPM 20-10-02.

B. Stress relieve after machining per SOPM 20-10-02.

C. Magnetic particle check per SOPM 20-20-01.

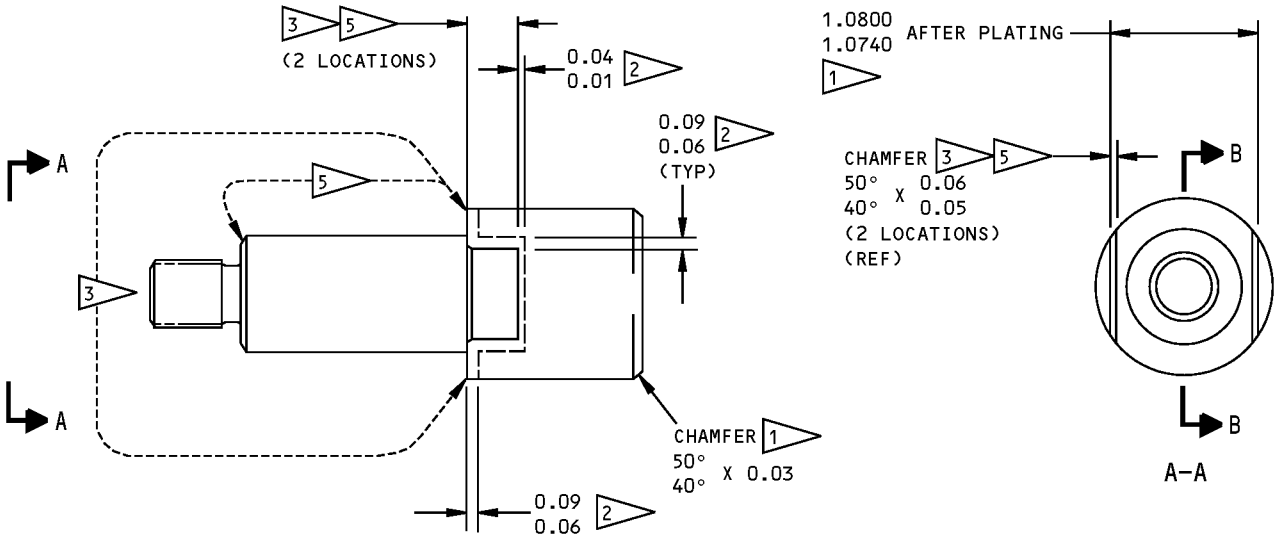
D. Shot peen as indicated per SOPM 20-10-03.

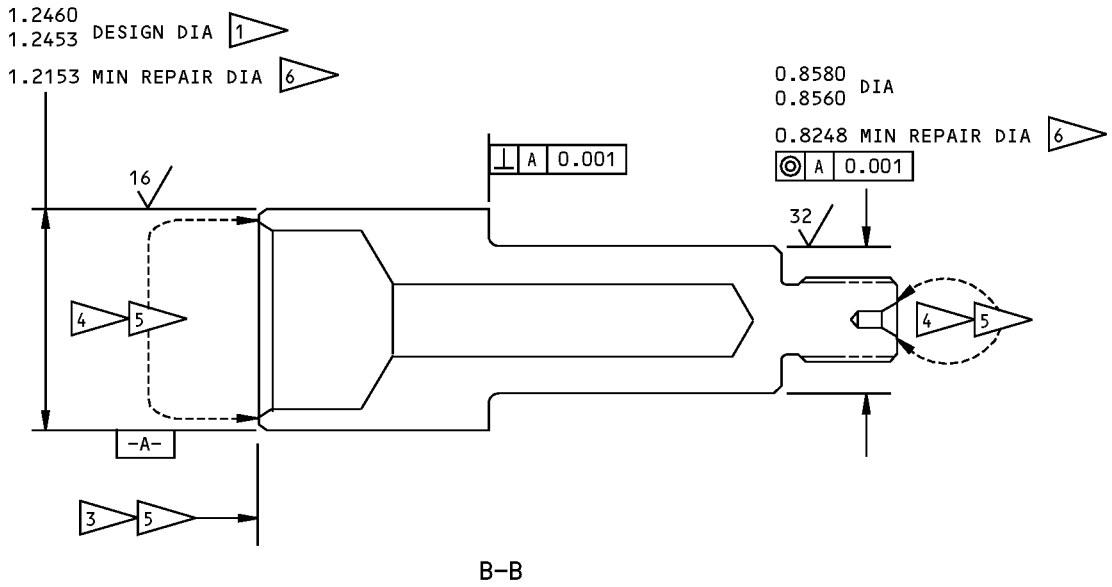
E. Build up repaired area with chrome plate per SOPM 20-42-03 and grind to design dimensions and finish shown.

F. 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 16-1, Figure 601.





69-73606-1 Universal Joint Bolt Repair
Figure 601 (Sheet 1 of 2)

REFINISH

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

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-15.32) 0.0003-0.0005 THICK

4 CADMIUM-TITANIUM PLATE THROW-IN OPTIONAL

5 APPLY BMS 10-11, TYPE 1 PRIMER (F-20.03)

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 UNLESS SHOWN DIFFERENTLY

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

69-73606-1 Universal Joint Bolt Repair
Figure 601 (Sheet 2 of 2)

CROSS PIN - REPAIR 17-1

69-73607–1, –2

1. General

A. This procedure has the data necessary to repair the cross pin.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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 (REPAIR 17-1, Figure 601)

A. Machine diameter as required, within repair limit shown, to remove defects.

B. Stress relieve by heating to 500-550°F for 4 hours (69-73607-1), or to 900-950°F for 2 hours (69-73607-2), then air-cooling at 65-75°F. Magnetic particle check per SOPM 20-20-01.

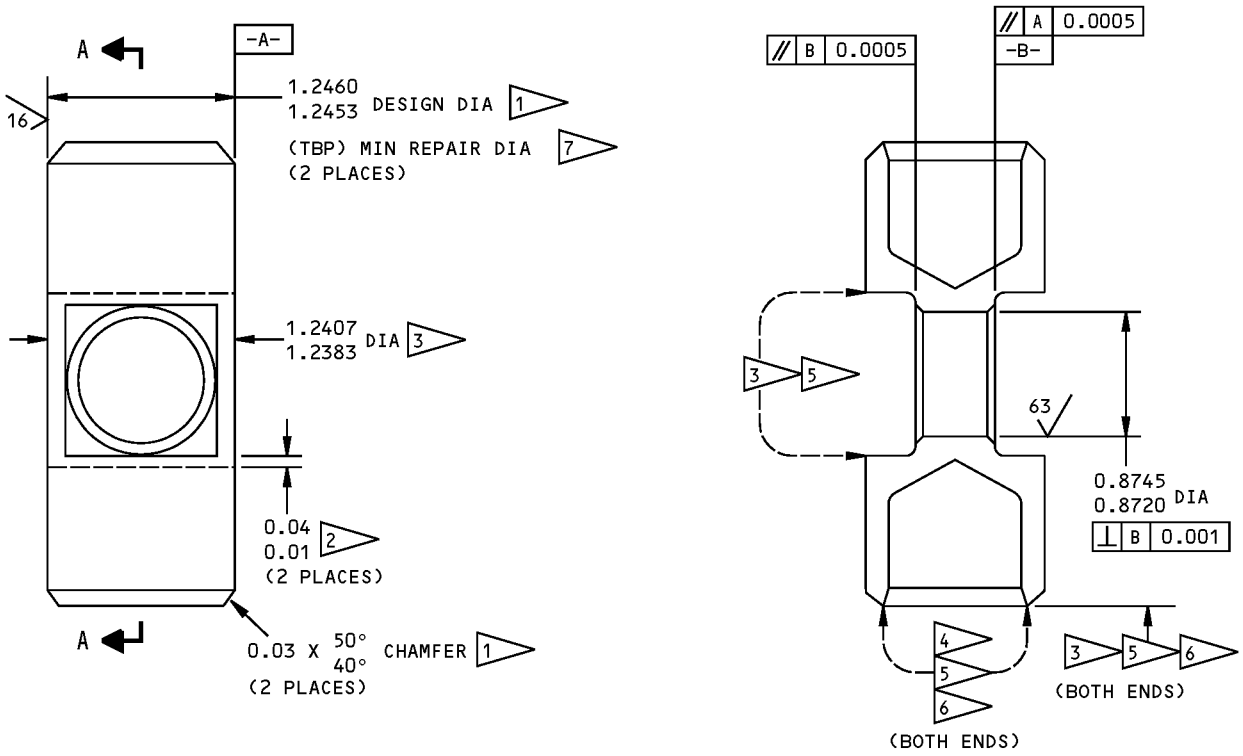
C. Shot peen as indicated per SOPM 20-10-03.

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

E. Magnetic particle check per SOPM 20-20-01.

3. Refinsih

A. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, REPAIR 17-1, 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 OPTIONAL

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: (69-73607-1) 4340M STEEL
(270-300 KSI)
(69-73607-2) MOD H-11 STEEL
(260-280 KSI)

ALL DIMENSIONS ARE IN INCHES

69-73607-1, -2 Cross Pin Repair
Figure 601

UNIVERSAL JOINT SPACER - REPAIR 18-1

69-73608–1

1. General

A. This procedure has the data necessary to repair the universal joint spacer.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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 (REPAIR 18-1, Figure 601)

A. Machine diameter as required, within repair limit shown, to remove defects.

B. Stress relieve by heating to 900-950°F for 2 hours (Mod H-11 steel), or to 500-550°F (4340M steel) for 4 hours, then air-cooling at 65-75°F. Magnetic particle check per SOPM 20-20-01.

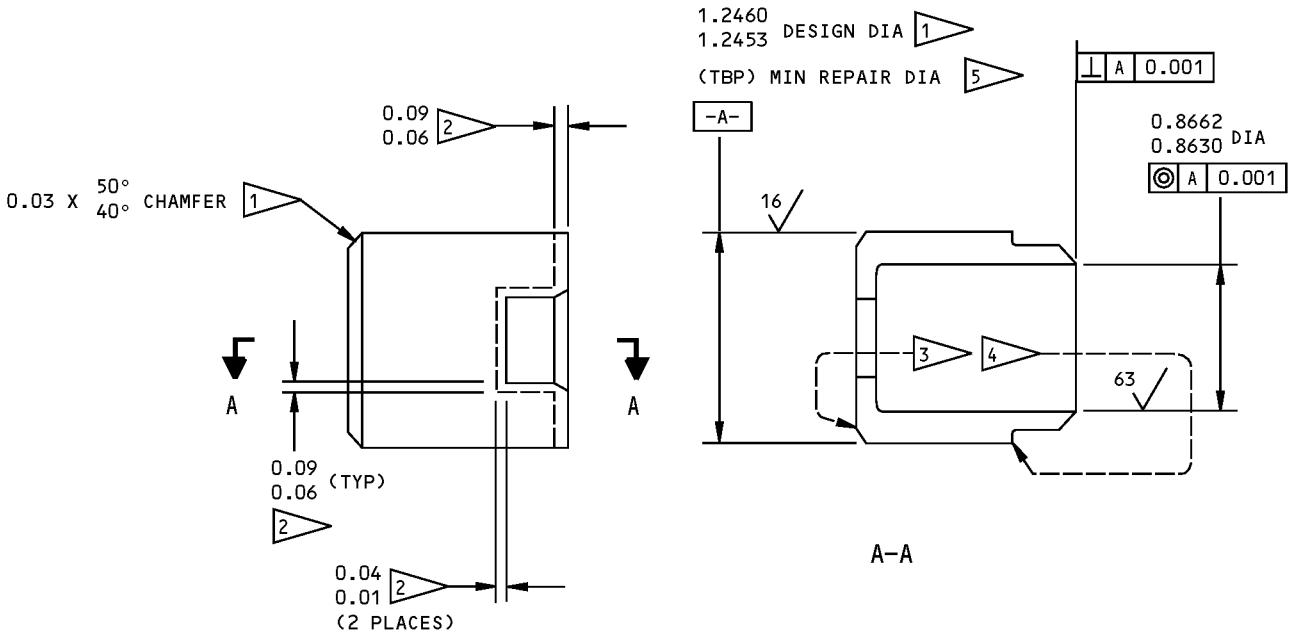
C. Shot peen as indicated per SOPM 20-10-03.

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

E. 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 18-1, 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-1.18) 0.0003-0.0005 THICK

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

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

REPAIR

REF 5

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: 4340M STEEL (270-300 KSI)
MOD H-11 STEEL (RC 54-56) (OPT)

ALL DIMENSIONS ARE IN INCHES

69-73608-1 Universal Joint Spacer Repair
Figure 601

TRUNNION CROSS - REPAIR 19-1

69-73609–1

1. General

A. This procedure has the data necessary to repair the trunnion cross.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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 (REPAIR 19-1, Figure 601)

A. Machine faces as required, within repair limits shown, to remove defects. Magnetic particle check per SOPM 20-20-01.

B. Shot peen as indicated per SOPM 20-10-03.

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

D. Magnetic particle check per SOPM 20-20-01.

3. Bore Repair (REPAIR 19-1, Figure 601)

A. Machine bore as required, within repair limits shown, to remove defects. No step or mismatch allowed. Magnetic particle check per SOPM 20-20-01.

B. Shot peen as indicated per SOPM 20-10-03.

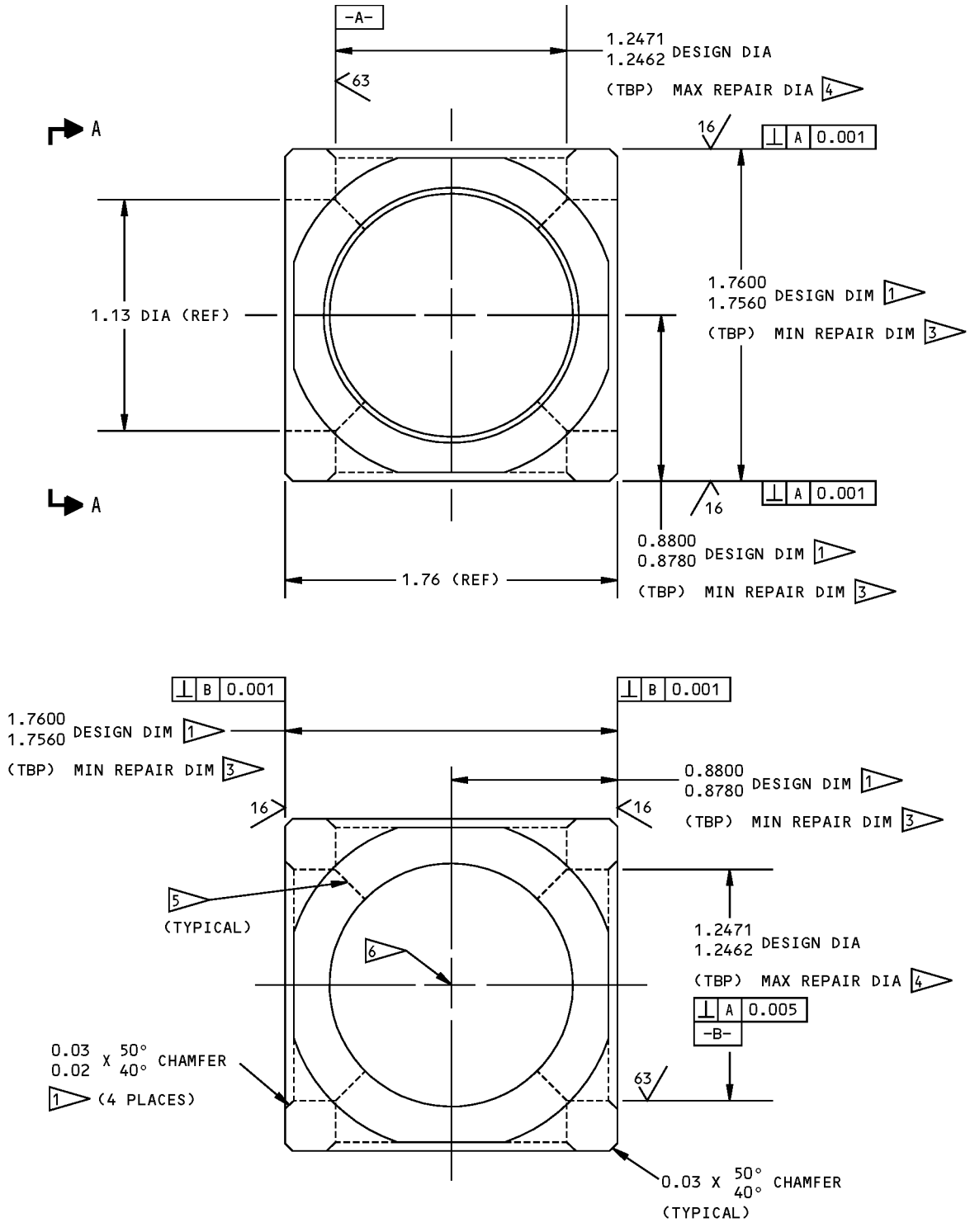
C. Build up repaired surface with nickel plate to 0.004-0.006 inch single plate thickness per SOPM 20-42-09.

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

E. 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 19-1, Figure 601.



69-73609-1 Trunnion Cross Repair
Figure 601 (Sheet 1 of 2)

REFINISH

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

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 (150-170 KSI)

ALL DIMENSIONS ARE IN INCHES

69-73609-1 Trunnion Cross Repair
Figure 601 (Sheet 2 of 2)

TORQUE BRAKE ASSEMBLY - REPAIR 20-1

182592

1. General

A. This procedure has the data necessary to repair the torque brake assembly.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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 (IPL Figure 1)

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

A. To shift torque lockout level to a higher value, machine housing (335) ID as shown in REPAIR 20-1, Figure 601.

B. To shift torque lockout level to a lower value, proceed as follows:

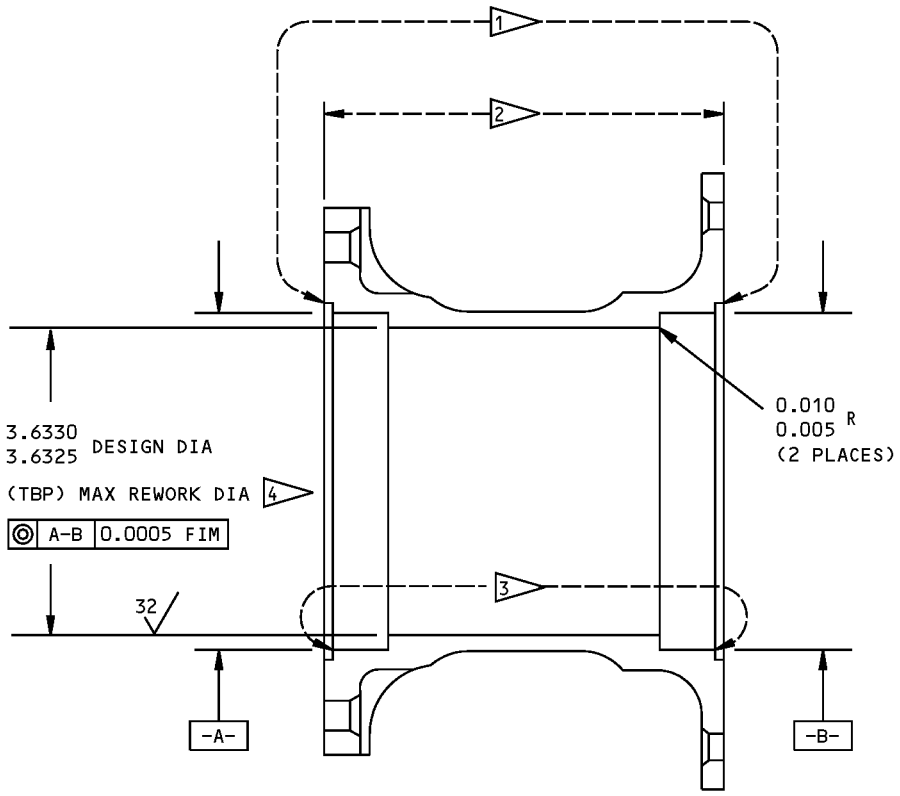
(1) Machine spring set (330) and stress relieve per REPAIR 20-1, Figure 602. Note amount of material removed.

(2) Build up OD of sleeves (320, 325) with chrome plate per SOPM 20-42-03 and grind SOPM 20-10-04 to required dimensions and finish. 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 20-1, Figure 601.



REFINISH

CADMIUM-PLATE (F-15.23) AS NOTED. APPLY ONE COAT PRIMER, BMS 10-11, TYPE 1 (SRF-12.205) PLUS ONE COAT ENAMEL, BMS 10-11, TYPE 2, COLOR BAC707 GRAY GLOSS (SRF-12.63) ON EXTERNAL SURFACES EXCEPT BOLT HOLES AND COUNTERSINKS

1. CADMIUM PLATE THESE SURFACES
2. APPLY PRIMER PLUS ENAMEL
3. CARBURIZE, 0.025-0.035 DEEP

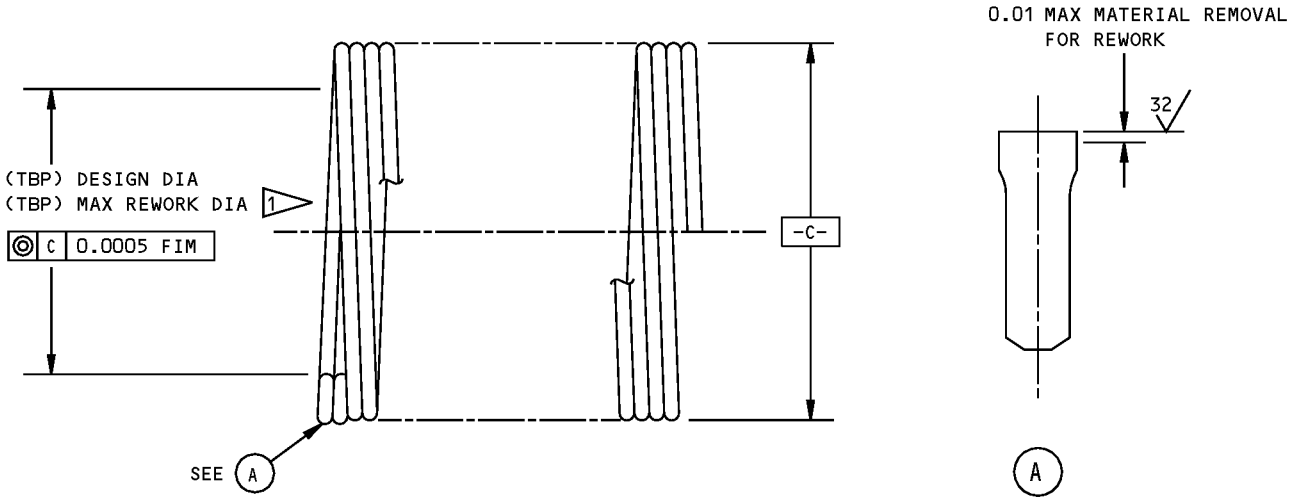
REWORK

4. MACHINE ID AS REQUIRED TO CHANGE TORQUE SETTING. TORQUE SETTING INCREASES (TBP) LB-IN. FOR EACH 0.001 INCREASE IN ID

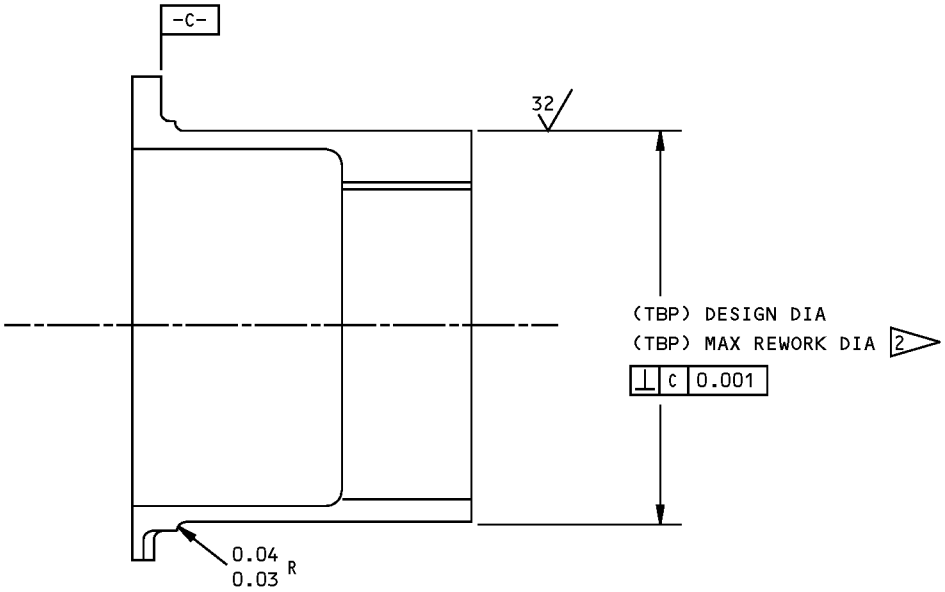
MATERIAL: STEEL PER AMS 6265
RC 32-43 CORE HARDNESS
CARBURIZED, RC 60 MIN AS NOTED

ALL DIMENSIONS ARE IN INCHES

182592 Housing Rework and Refinish
Figure 601

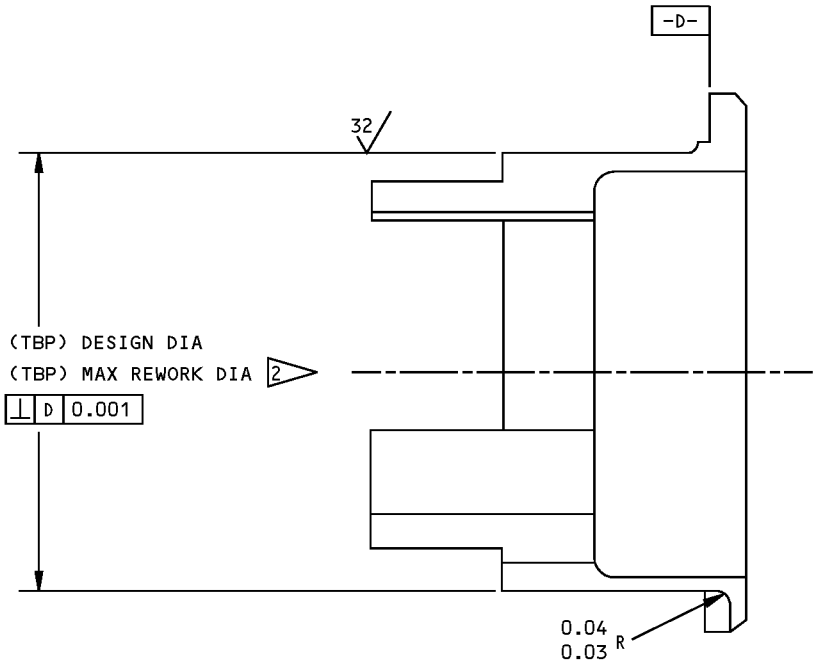


SPRING SET (330)



SLEEVE (320)

182592 Spring Set and Sleeve Rework
Figure 602 (Sheet 1 of 2)



SLEEVE (325)

REWORK

1 MACHINE SPRING SET (330) 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 (320,325) 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

182592 Spring Set and Sleeve Rework
Figure 602 (Sheet 2 of 2)

NAMEPLATE - REPAIR 21-1

69-52461–1

1. General

A. This procedure has the data necessary to repair the nameplate.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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 (IPL Figure 1)

A. Remove damaged or defective nameplate (595) per SOPM 20-50-05.

B. Clean and prepare gear housing (560, 565) mounting surface per SOPM 20-50-12.

C. Stamp new nameplate with part no. and serial no. per SOPM 20-50-10 and bend to contour of housing.

D. Bond nameplate to housing with RTV 133 adhesive, A00924 (Ref SOPM 20-50-12).

MISCELLANEOUS PARTS REFINISH - REPAIR 22-1

1. General

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

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) for the 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. Refinish

A. Repair of parts listed in REPAIR 22-1, Table 601 consists of restoration of the original finish.

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Housing (60,65)	Al alloy	Sulfuric acid anodize (F-17.03) all over. Apply primer, C00259 (F-20.02) plus enamel coating, C00260 (SRF-12.63) on exterior surfaces, except omit primer and enamel on drain hole and on torque brake mating surface.
Retainer (80), Plate (105)	Al alloy	Sulfuric acid anodize (F-17.03). Apply primer, C00259 (F-20.02) plus enamel coating, C00260 (SRF-12.63) or coating, C00700 (SRF-14.9813), except no enamel on unexposed surfaces of retainer.
Pin (110)	Mod H-11 Steel RC 54-56 or 4340M Steel 270-300 ksi	Apply primer, C00259 (F-20.02) all over.
Support (290, 295)	Al alloy	Sulfuric acid anodize (F-17.03) all over. Apply primer, C00259 (F-20.02) plus enamel coating, C00260 (SRF-12.63) to edge of flange only.
Spacer (410)	Al alloy	Alodize or chromic acid anodize (F-2.22) all over.
Washer (435)	4130 Steel 120-150 ksi	Cadmium-titanium alloy plate (F-1.181) all over.
Coupling (440)	4340 Steel 150-180 ksi	Cadmium-titanium alloy plate (F-15.01) all over, except plating optional on bolt holes.

ASSEMBLY

1. General

A. This procedure has the necessary data to assemble the trailing edge flap drive system No. 2 and No.7 transmission assembly.

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

C. Refer to IPL Figure 1 for item numbers.

2. Lubrication

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D50090	Hydraulic Fluid - Petroleum Base NATO H-515 PETROLEUM BASE AIRCRAFT HYDRAULIC FLUID	MIL-PRF-5606H (NATO H-515)

B. Procedure

(1) Install all packings and seals with hydraulic fluid, D50090 unless alternate assembly instructions are specified.

(2) Immerse internal parts in hydraulic fluid, D50090 and assemble while wet unless alternate assembly instructions are specified.

3. Assembly (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-5461	Adapter - Torque Wrench (Part #: ST6105-1, 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

Reference	Description	Specification
D50090	Hydraulic Fluid - Petroleum Base NATO H-515 PETROLEUM BASE AIRCRAFT HYDRAULIC FLUID	MIL-PRF-5606H (NATO H-515)
G01505	Lockwire - Safety And Lock	NASM20995
G50347	Lockwire - Nickel-copper, 0.032 inch diameter	NASM20995N˜ C32

C. References

Reference	Title
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES
SOPM 20-50-03	BEARING AND BUSHING REPLACEMENT

D. Procedure

(1)

(2) Determine shim (545, 550) thicknesses (ASSEMBLY, Figure 701).

NOTE: If bearing (540) or gear housing assembly (560 or 565) have not been replaced, shims (545, 550) removed during disassembly may be reinstalled.

(a) Measure and record dimension B, as shown in ASSEMBLY, Figure 701.

NOTE: It is not necessary to have bearing (540) installed in housing assembly (560, 565) to measure dimension B. This can be done with bearing (540) removed from the housing assembly and supported and loaded as shown in the shimming diagram of ASSEMBLY, Figure 701.

(b) Find and record dimension A, which is engraved on housing assembly (560, 565).

(c) Complete the shimming calculation, as specified in the applicable shimming diagram of ASSEMBLY, Figure 701, to find the thickness, X1, of shim (545).

(d) Make shim (545) of thickness X1 by removal of the necessary number of 0.002-inch laminations from a new shim of full thickness.

NOTE: A new shim of full thickness is 0.048 to 0.054 inch thick. Measure the thickness of the new shim so it is known exactly how many 0.002-inch laminations must be removed to make shim (545).

(e) Install shim (545) into housing assembly (560, 565).

(f) Measure and record dimension D, as specified in the applicable shimming diagram of ASSEMBLY, Figure 701.

NOTE: It is not necessary to have bearing (540) installed in housing assembly (560, 565) to measure dimension D. This can be done with bearing (540) removed from the housing assembly and supported and loaded as shown in the shimming diagram of ASSEMBLY, Figure 701.

(g) Find and record dimension C, which is engraved on housing assembly (560, 565).

(h) Complete the shimming calculation, as specified in the applicable shimming diagram of ASSEMBLY, Figure 701, to find the thickness, X2, of shim (550).

(i) Make shim (550) of thickness X2 by removal of the necessary number of 0.002-inch laminations from a new shim of full thickness.

NOTE: A new shim of full thickness is 0.038 to 0.042 inch thick. Measure the thickness of the new shim so it is known exactly how many 0.002-inch laminations must be removed to make shim (550).

(3) Install gears (535, 555) in gear housing.

(a) Install shim (550) onto gear (555).

(b) Apply hydraulic fluid, D50090 to inner surface of bearing (540).

(c) Assemble bearing (540) and gear (535) together with gear (555).

(d) Install parts into housing assembly (560 or 565).

(e) Assemble bearing (530) together with the cover/tube assembly (500).

1) Apply a thin layer of sealant, A00247 to the inner surface of the cover/tube assembly (500) that will contact bearing (530) when assembly is complete.

2) Apply a thin layer of sealant, A00247 to the outer ring surface of bearing (530).

3) Assemble bearing (530) together with cover/tube assembly (500) (Ref SOPM 20-50-03).

4) Remove excess sealant, A00247 from bearing (530) and cover/tube assembly (500).

(f) Install packing (525) onto cover/tube assembly (500).

1) Apply a thin layer of sealant, A00247 to the groove on the outer surface of cover/tube assembly (500).

2) Install packing (525) onto cover/tube asembly (500).

3) Remove excess sealant, A00247 from packing (525) and the cover/tube assembly (500).

(g) Assemble cover/tube assembly (500) together with housing assembly (560, 565).

1) Apply a thin layer of sealant, A00247 to the shaft surface of gear (555) that will contact bearing (530) when assembly is complete.

2) Apply a thin layer of sealant, A00247 to the surface of the inner ring of bearing (530).

3) Assemble cover/tube assembly (500) and bearing (530) together with housing assembly (560, 565).

4) Install four sets of bolt (490) and washer (495), and tighten each bolt (490) to 80-100 pound-inches.

(4) Determine shim (465) thickness (ASSEMBLY, Figure 701).

NOTE: If retainer (455), bearing (485), or gear housing assembly (560 or 565) have not been replaced, shim removed during disassembly may be reinstalled.

Shim (465) has the same application at two locations on the transmission assembly. Complete the series of steps below for each location where shim (465) is used.

(a) Measure and record dimension E, as shown in ASSEMBLY, Figure 701.

NOTE: It is not necessary to have bearing (485) position on the retainer (455) to measure dimension E. This can be done with bearing (485) separate from retainer (455), but supported and loaded as shown in the shimming diagram of ASSEMBLY, Figure 701.

(b) Find and record dimension F, which is engraved on housing assembly (560, 565).

(c) Complete the shimming calculation, as shown in the applicable shimming diagram of ASSEMBLY, Figure 701, to find the thickness, X3, of shim (465).

(d) Make shim (465) of thickness X3 by removal of the necessary number of 0.002-inch laminations from a new shim of full thickness.

NOTE: A new shim of full thickness is 0.050 to 0.054 inch thick. Measure the thickness of the new shim so it is known exactly how many 0.002-inch laminations must be removed to make shim (465).

(5) Measure the normal backlash between each gear (475), and gear (535), and make any necessary adjustments.

NOTE: The normal backlash is measured and adjusted with only one gear (475) installed at a time. This makes it possible to directly measure the normal backlash between gears (475) and (535). Installation of both gears (475) makes it not possible to directly measure normal backlash between gears (475) and (535).

(a) Temporarily install bearings (480, 485) on bevel gear (475).

(b) Temporarily install shims (465) onto retainers (455).

(c) Temporarily install bevel gear (475) into retainer (455).

(d) Assemble bevel gear and retainer together with housing assembly (560, 565).

(e) Install bolts (445) and washers (450). Tighten bolts to 80-100 pound-inches.

NOTE: Parts are being installed temporarily to check backlash. Seals (470) and packings (460) are not installed at this time.

(f) Check normal backlash between gears (475) and (535). Normal backlash should be between 0.002-0.008 inch.

NOTE: If necessary, refer to gear manufacturing industry standards for complete procedures on how to measure backlash in bevel gear sets.

CAUTION: BE CAREFUL NOT TO DAMAGE ANY PARTS OF THE TRANSMISSION ASSEMBLY WHEN YOU LOCK GEARS TO MEASURE BACKLASH.

1) Lock gear (475) in place.

NOTE: To correctly measure backlash, the pinion of a gear set must always be satisfactorily locked so that it does not rotate. Make sure that gear (475) is directly locked. If gear (475) is indirectly locked through coupling (440), the value for backlash could be in error. Any backlash between the spline of gear (475) and coupling (440) would be included in the measured value of backlash. This would make the measured value for normal backlash greater than the actual value.

2) Set the tip of a dial indicator on the extreme heel of a tooth on gear (535). Make sure to position the tip of the dial indicator normal to the face of a gear tooth so that a rotational motion of gear (535) is indicated. Make sure that the tip of the dial indicator maintains positive contact with the face of the gear tooth.

NOTE: Access the teeth of gear (535) through the opening in housing assembly (560, 565) where the second gear (475) is usually installed.

3) Carefully turn gear (555) back and forth to its positive limits of travel. Record the indication of the dial indicator as gear (555) is turned.

NOTE: The difference between the maximum and minimum values shown by the dial indicator is the value for normal backlash between gears (475) and (535).

(g) If the value for normal backlash is less than 0.002 inch, do the following steps.

1) Remove the retainer (455), shim (465), bearings (480, 485) and gear (475) from housing assembly (560, 565).

2) Increase the thickness of shim (465). This will increase the amount of backlash between gear (475) and gear (535).

3) Reinstall the retainer (455), shim (465), bearings (480, 485) and gear (475) into housing assembly (560, 565).

4) Check for the normal backlash as detailed in ASSEMBLY, Paragraph 3.D.(5)(f) and adjust as required.

(h) If the value for normal backlash is more than 0.008 inch, do the following steps.

1) Remove the retainer (455), shim (465), bearings (480, 485) and gear (475) from housing assembly (560, 565).

2) Decrease the thickness of shim (465). This will decrease the amount of backlash between gear (475) and gear (535).

3) Reinstall the retainer (455), shim (465), bearings (480, 485) and gear (475) into housing assembly (560, 565).

4) Check for the normal backlash as detailed in ASSEMBLY, Paragraph 3.D.(5)(f) and adjust as required.

(i) If the value for normal backlash is between 0.002 and 0.008 inch, do the following step.

1) Remove the retainer (455), shim (465), bearings (480, 485) and gear (475) from housing assembly (560, 565). Make sure that these parts are installed on the correct side of the housing during final assembly.

(j) Repeat ASSEMBLY, Paragraph 3.D.(5)(a) thru ASSEMBLY, Paragraph 3.D.(5)(i) for the opposite gear (475) and retainer (455).

(6) Determine shim (350) thickness (ASSEMBLY, Figure 701).

NOTE: If bearing (365), housing (560 or 565), or torque brake support (295) have not been replaced, shim removed during disassembly may be reinstalled.

(a) Measure and record dimension H as shown in the applicable shimming diagram of ASSEMBLY, Figure 701.

NOTE: It is not necessary to have bearing (365) installed in support (295) to measure dimension H. This can be done with bearing (365) removed from the housing assembly and supported and loaded as shown in the shimming diagram of ASSEMBLY, Figure 701.

(b) Find and record dimension G, which is engraved on housing assembly (560, 565).

(c) Complete the shimming calculation, as shown in the applicable shimming diagram of ASSEMBLY, Figure 701, to find the thickness, X4, of shim (350).

(d) Make shim (350) of thickness X4 by removal of the necessary number of 0.002-inch laminations from a new shim of full thickness.

NOTE: A new shim of full thickness is 0.048 to 0.052 inch thick. Measure the thickness of the new shim so it is known exactly how many 0.002-inch laminations must be removed to make shim (350).

(7) Measure the backlash between each gear (555), and gear (360), and make any necessary adjustments.

(a) Temporarily assemble gear (360) and related parts together with housing assembly (560, 565).

1) Remove support (295) from torque brake assembly (285), if installed.

2) Apply a thin layer of hydraulic fluid, D50090 to the inner and outer surfaces of bearings (365, 370).

3) Assemble bearing (365, 370) together with gear (360).

4) Assemble shim (350) together with support (295).

NOTE: Gear (360) and related parts are only temporarily assembled to do a check and adjust backlash. Because of this, packing (345) and ring (355) will not be included in the assembly at this time.

5) Assemble gear (360) and related parts together with support (295) and related parts.

6) Position gear (360) and support (295) assembly on the housing assembly (560, 565).

7) Attach the support (295) to the housing assembly (560, 565) with four sets of a bolt, washer (275), and nut (270). Tighten each nut (270) to 180-210 pound-inches.

NOTE: Fasteners (270 thru 280) may be used if temporary spacers, of same thickness as torque brake housing (335) mounting lugs, are used to fill out bolt grip lengths. Alternatively, use shorter bolts. Parts are being installed temporarily, to check backlash.

(b) Check the backlash between gears (555) and (360). Measurement of backlash at the interface of the gears will give a value for normal backlash. The normal backlash between gears (555) and (360) should be 0.002 to 0.008 inch. Measurement of backlash at the spline of gear (360) will give a value for transverse backlash. The transverse backlash should be 0.001 to 0.004 inch.

NOTE: If necessary, refer to gear manufacturing industry standards for complete procedures on how to measure backlash in bevel gear sets.

CAUTION: BE CAREFUL NOT TO DAMAGE ANY PARTS OF THE TRANSMISSION ASSEMBLY WHEN YOU LOCK GEARS TO MEASURE BACKLASH.

1) Lock gear (555) in place.

NOTE: To correctly measure backlash between gear (555) and gear (360), gear (555) must always be satisfactory locked so that it does not rotate.

2) Set the tip of a dial indicator on a spline tooth of gear (360).

NOTE: Make sure to position the tip of the dial indicator normal to the face of a spline tooth so that the rotational motion of the gear (360) is indicated.

3) Carefully turn gear (360) back and forth to its positive limits of travel.

NOTE: Make sure that there is always positive contact between the tip of the dial indicator and a spline tooth of gear (360).

4) Watch and record this indication of the dial indicator as gear (360) is turned back and forth to its positive limits of travel.

NOTE: The difference between the maximum and minimum values shown by the dial indicator is the value for transverse backlash measured at a splice tooth of gear (360).

(c) If the value for transverse backlash at the spline tooth of gear (360) is less than 0.001 inch, do these steps:

NOTE: A value of 0.001 inch for transverse backlash measured at a spline tooth of gear (360) is approximately equal a value of 0.002 inch of normal backlash.

1) Remove support (295), shim (350), gear (360) and bearings (365, 370) from housing assembly (560, 565).

2) Decrease the thickness of shim (350). This will increase the backlash between gear (360) and gear (555).

3) Reassemble support (295), shim (350), gear (360) and bearings (365, 370) together with housing assembly (560, 565).

4) Measure the backlash as detailed in ASSEMBLY, Paragraph 3.D.(7)(b).

(d) If the value for transverse backlash at the spline tooth of gear (36) is more than 0.004 inch, do these steps.

NOTE: A value of 0.004 inch for transverse backlash measured at a spline tooth of gear (360) is approximately equal to a value of 0.008 inch of normal backlash.

1) Remove support (295), shim (350), gear (360) and bearings (365, 370) from housing assembly (560, 565).

2) Increase the thickness of shim (350). This will decrease the backlash between gear (360) and gear (555).

3) Reassemble support (295), shim (350), gear (360) and bearings (365, 370) together with housing assembly (560, 565).

4) Measure the backlash as detailed in ASSEMBLY, Paragraph 3.D.(7)(b).

(e) If the value for transverse backlash at the spline tooth of gear (360) is between 0.001 and 0.004 inch, do these steps.

NOTE: A value of 0.001 inch for transverse backlash measured at a spline tooth of gear (360) is approximately equal a value of 0.002 inch of normal backlash.

A value of 0.004 inch for transverse backlash measured at a spline tooth of gear (360) is approximately equal to a value of 0.008 inch of normal backlash.

1) Remove support (295), shim (350), gear (360) and bearings (365, 370) from housing assembly (560, 565).

(8) Assemble torque brake assembly (285) (ASSEMBLY, Figure 702).

NOTE: Coat all surfaces of torque brake components with hydraulic fluid, D50090 as parts are assembled.

(a) Position ends of springs in spring set (330) approximately 180 degrees apart.

NOTE: Spring set (330) consists of two matched springs coiled together.

(b) Place spring set in 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 (320). Insert sleeve into spring set until flange is firmly seated.

(f) Use aluminum drift to tap spring stops outward on opposite side of Spring Expansion Fixture, SPL-5463, just far enough to clear flange of sleeve (325). Insert sleeve into spring set so internal lugs align with sleeve (320). Ensure that both sleeves (320, 325) are properly seated.

(g) Insert adapter (315) into sleeve (320) with ears of adapter partially engaging sleeve lands, and splined end of adapter protruding approximately one inch from sleeve flange. Support adapter (315) 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 Spring Expansion Fixture, SPL-5463 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 (320, 325) and apply 75-100 pound end load to stack springs tight. Install end rings (305) over spring set and press down to remove clearance and end play.

(j) Measure stacked height of assembled parts immediately after removing end load. Select shims (310) as required to obtain 4.137-4.149 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 (300) is to be stored as a spare, install both end rings and secure assembly with, lockwire, G01505 (size optional).

(m) For current installation of spring pack, install one end ring (305) on sleeve (325) end. Insert opposite end of spring pack into housing (335), then press remaining end ring into housing and over spring set.

(9) Install retainer (390) and support (395) onto housing (560, 565).

(a) Install packing (425) onto support (395).

1) Apply a thin layer of sealant, A00247 to the groove on the inner surface of support (395).

2) Install packing (425) together with support (395).

3) Wipe excess sealant, A00247 from packing (425) and support (395).

(b) Install seal (405) together with retainer (390).

1) Apply a thin layer of sealant, A00247 to the inner surface of retainer (390) that will contact seal (405) when the assembly is complete.

2) Apply a thin layer of sealant, A00247 to the outer diameter surface of seal (405).

3) Install seal (405) onto retainer (390).

4) Wipe excess sealant, A00247 from seal (405) and retainer (390).

(c) Apply a thin layer of hydraulic fluid, D50090 to the surface of the outer ring of bearing (415).

(d) Install bearing (415) onto support (395).

(e) Install spacer (410) onto support (395).

(f) Assemble support (395) and related parts together with retainer (390).

(g) Install packing (420) onto housing (560, 565).

1) Apply a thin layer of sealant, A00247 to the groove in the inner surface of housing assembly (560, 565).

2) Install packing (420) onto housing (560, 565).

3) Wipe excess sealant, A00247 from packing (420) and housing assembly (560, 565).

(h) Install packings (400) together with housing (560, 565) (seven locations).

1) Apply a thin layer of sealant, A00247 to the surface of each counterbore on the housing (560, 565).

2) Install each packing (400) onto housing (560, 565).

3) Wipe excess sealant, A00247 from each packing (400) and housing assembly (560, 565).

(i) Install retainer (390), support (395) and related parts onto housing (560, 565).

1) Position the retainer (390), support (395) and related parts onto housing (560, 565).

2) Apply sealant, A00247 to the shank of each of seven bolts (385).

3) At several locations, put bolts (385) through the holes in the housing (560, 565), the packings (400) and the holes in the support (395) and retainer (390).

4) At seven locations, install a washer (380) and nut (375) on each bolt (385).

5) Tighten each nut (375) to 50-70 pound-inches.

6) Wipe excess sealant, A00247 from each bolt (385) and housing assembly (560, 565).

(10) Install packings (283) and supports (290, 295) onto housing (335).

(a) Apply a thin layer of sealant, A00247 to each groove on the flange of housing (335).

(b) Install packings (283) onto housing (335).

(c) Wipe excess sealant, A00247 from packings (283) and housing (335).

(d) Install supports (290) onto housing (335).

(11) Install gear (360) and torque brake assembly (285) into housing assembly (560 or 565).

(a) Apply a thin layer of sealant, A00247 to the groove on the outer surface of support (295).

(b) Install packing (345) onto support (295).

(c) Wipe excess sealant, A00247 from packing (345) and support (295).

(d) Insert short splined end of torque brake coupling (340) into internally splined end of gear (360) and secure with ring (355).

(e) Assemble bearing (370) together with gear (360) and attached coupling (340).

(f) Position gear (360) with attached coupling (340) and bearing (370) in housing assembly (560 or 565).

(g) Install shim (350) on support (295).

(h) Attach torque brake housing (335) and support (295) to gear housing assembly with parts (270 thru 280). Tighten nuts (270) to 180-250 lb-in.

(12) Install packing (460), seal (470), bearing (480) and shim (465) onto retainer (455).

(a) Apply a thin layer of sealant, A00247 to the groove on the outer surface of retainer (455).

(b) Install packing (460) onto retainer (455).

(c) Wipe excess sealant, A00247 from packing (460) and retainer (455).

(d) Apply a thin layer of sealant, A00247 to the inner surface of retainer (455) that will contact seal (470) when assembly is complete.

(e) Apply a thin layer of sealant, A00247 to the outer diameter surface of seal (470).

(f) Assemble seal (470) together with retainer (455).

(g) Wipe sealant, A00247 from seal (470) and retainer (455).

(h) Apply a thin layer of sealant, A00247 to the inner surface of retainer (455) that will contact bearing (480) when assembly is complete.

(i) Apply a thin layer of sealant, A00247 to the outer ring surface of bearing (480).

(j) Assemble bearing (480) together with retainer (455) (Ref 20-50-03).

(k) Wipe excess sealant, A00247 from bearing (480) and retainer (455).

(l) Apply a thin layer of sealant, A00247 to the inner surface of the flange on retainer (455) that will contact shim (465) at assembly.

(m) Apply a thin layer of sealant, A00247 to one surface of shim (465).

(n) Assemble shim (465) together with retainer (455).

NOTE: Make sure the holes in shim (465) are aligned with the holes in retainer (455).

(13) Install bearing (485) onto gear (475).

(a) Apply a thin layer of sealant, A00247 to the area on the shaft of gear (475) that will contact the inner ring of bearing (485) when assembly is complete.

(b) Apply a thin layer of sealant, A00247 to the inner ring surface of bearing (485).

(c) Assemble bearing (485) together with gear (475) (SOPM 20-50-03).

(d) Wipe excess sealant, A00247 from bearing (485) and gear (475).

(14) Install gear (475) and coupling (440) onto retainer (455).

(a) Apply a thin layer of sealant, A00247 to the inner ring surface of bearing (480).

(b) Apply a thin layer of sealant, A00247 to the area on the shaft of gear (475) that will contact the inner ring surface of bearing (480) at assembly.

(c) Apply a thin layer of hydraulic fluid, D50090 to the inner diameter surface of seal (470).

(d) Install gear (475) onto bearing (480) and seal (470) that is installed in retainer (455).

(e) Apply a thin layer of sealant, A00247 to the internal spline of coupling (440).

(f) Apply a thin layer of sealant, A00247 to the threaded stud of gear (475).

(g) Install the coupling (440) on gear (475).

(h) Install washer (435) and nut (430) in the threaded stud of gear (475).

(i) Tighten nut (430) to 160-190 pound-inches.

NOTE: Use the F71228-500 Splined Coupling Spanner Wrench, SPL-5415 to hold coupling (440) when nut (430) is tightened.

(15) Install the assembly of gear (475) and retainer (455) onto housing (560, 565).

(a) Apply a thin layer of sealant, A00247 to the surface of housing (560, 565) that will contact the shim (465) and the outer ring surface of bearing (485) at assembly.

(b) Apply a thin layer of sealant, A00247 to the outer ring surface of bearing (485).

(c) Apply a thin layer of sealant, A00247 to the surface of shim (465).

(d) Install one assembly of gear (475) and retainer (455) onto housing assembly (560, 565).

(e) Install bolts (445) and washers (450). Tighten each bolt (455) to 80-100 pound-inches.

(f) Wipe excess sealant, A00247 from retainer (455) and housing (560, 565).

(16) Repeat ASSEMBLY, Paragraph 3.D.(12) thru ASSEMBLY, Paragraph 3.D.(15) for the opposite side.

(17) Assemble universal joint assembly (220).

(a) Position trunnion cross (250) in yoke (240) and insert cross pin (245) through yoke and cross.

CAUTION: KEEP BEARING SURFACES OF BOLT (230) FREE OF CORROSION PREVENTIVE COMPOUND OR ASSEMBLY MAY BIND OR EXPERIENCE EXCESSIVE WEAR. INSTALL BOLT AND NUT ON OUTPUT SHAFT AND NOT THE YOKE OR INTERFERENCE WILL OCCUR.

(b) Coat shank and threads of bolt (230) with compound, C00528 per ASSEMBLY, Figure 704. Position output shaft (255) on cross and install bolt, spacer (235), and nut (225). Ensure that self-locking mechanism of nut develops torque of 34-150 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.

NOTE: Recheck torque of self-locking feature if applied torque exceeds 500 lb-in. during installation.

(18) Determine shim (215) thicknesses (ASSEMBLY, Figure 701).

NOTE: If bearing (180), support (290), or housing (60) have not been replaced, shim (215) removed during disassembly may be reinstalled.

(a) Measure and record dimension K, as specified in the shimming diagram of ASSEMBLY, Figure 701.

(b) Assemble bearing (180) and support (290) together with housing (60).

(c) Measure and record dimension J, as specified in the shimming diagram of ASSEMBLY, Figure 701.

(d) Complete the shimming calculation, as specified in the shimming diagram of ASSEMBLY, Figure 701, to find the thickness, X5, of shim (215).

(e) Make shim (215) of thickness X5 by removal of the necessary number of 0.002 inch laminations from a new shim of full thickness.

NOTE: A new shim of full thickness is 0.046 to 0.050 inch thick. Measure the thickness of the new shim so it is known exactly how many 0.002-inch laminations must be removed to make shim (215).

(f) Remove support (290) and bearing (180) from housing (60).

(19) Position support (290) over ratchet (185), then press bearing (180) onto ratchet.

(20) Determine shim (170) thickness (ASSEMBLY, Figure 701).

(a) Assemble parts (145-210) and (290) together with output shaft (255).

(b) Tighten nut (145) to 50-70 pound-inches using torque wrench adapter, SPL-5461.

(c) Measure the axial free play between ball bearings (165 and 205) when the assembly is loaded under a 50-pound axial load as shown in the shimming diagram of ASSEMBLY, Figure 701.

(d) Adjust the thickness of shim (170) as necessary to obtain 0.002-0.005 inch axial free play. Shim (170) may be adjusted by the removal of 0.002-inch laminations.

(e) Disassemble parts (145 thru 210), (290) and (225).

(21) Install universal joint assembly (220).

(a) Insert universal joint assembly (220) through gear housing and torque brake assembly.

(b) Install support (265) on output shaft, making sure support engages torque brake coupling (315).

CAUTION: DO NOT USE PREVIOUSLY INSTALLED WASHER (150), OR FAILURE OF TANGS AND LOSS OF NUT RETENTION MAY OCCUR.

(c) Install parts (145 thru 210, 290) on output shaft. Tighten nut (145) to 200-240 lb-in., and secure by bending two tangs of washer (150) into slots in nut.

(22) Install forward housing assembly.

(a) Install packings (115) on pins (110), then install parts (110 thru 125) in forward housing assembly (40 or 45).

(b) Apply primer, C00259 to faying surfaces of retainers (105) and install on housing with parts (95, 100).

(c) Insert springs (90) into forward housing. Install packings (85) on retainers (80). Apply primer, C00259 to faying surfaces of retainers and install on housing with parts (70, 75).

(d) Install shim (215) onto support (290).

1) Apply a thin layer of sealant, A00247 to the inner surface of the flange on support (290) that will contact shim (215) at assembly.

2) Apply a thin layer of sealant, A00247 to one surface of shim (215).

3) Assemble shim (215) together with support (290).

NOTE: Make sure the holes in shim (217) are aligned with the holes in support (290).

(e) Install packing (212) onto support (290).

1) Apply a thin layer of sealant, A00247 to the groove on the inner surface of support (290).

2) Assembly packing (212) together with support (290).

3) Wipe all surplus sealant, A00247 from packing (212) and support (290).

(f) Assemble housing assembly (40, 45) and related parts together with torque brake assembly (285).

1) Apply a thin layer of sealant, A00247 to the inner surface of the flange on housing (40, 45) that will contact shim (215) at assembly.

2) Apply a thin layer of sealant, A00247 to shim (215).

3) Assemble housing assembly (40, 45) together with torque brake assembly (285).

4) Install bolts (30) and barrel nuts (35).

5) Install bolt (20), washer (15), and nut (10).

6) Install bolt (25).

7) Tighten bolts (20) and (30) to 450-550 pound-inches.

8) Tighten nut (10) to 300-500 pound-inches.

(23) Install drain plugs (142, 585) and packings (143, 590). Lockwire plug (142) and bolts (70) together. Lockwire plug (585) to gear housing. Install lockwire, G50347 per SOPM 20-50-02, double-twist method.

(24) Raise forward housing, tilting assembly until output shaft is at 3 degrees with respect to horizontal. Fill assembly through upper filler port with hydraulic fluid, D50090 until fluid reaches port level. Capacity range is 21-24 ounces. Install plug (515) with new packing (520). Lockwire plug to cover (505) using lockwire, G50347 per SOPM 20-50-02, double-twist method.

(25) Lockwire the three bolts (445) together using lockwire, G50347 (SOPM 20-50-02).

(26) Lockwire the four bolts (490) together lockwire, G50347 (SOPM 20-50-02).

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

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

(29) 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) Joint between support (290) and housings (335, 40 or 45)

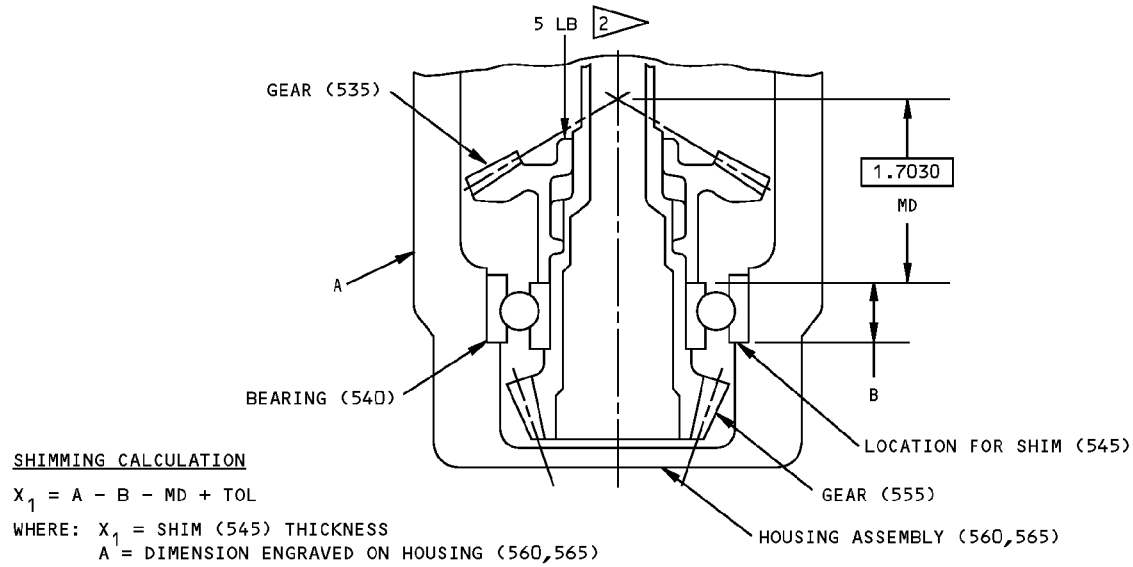
(b) Joint between support (295) and housings (335, 560 or 565)

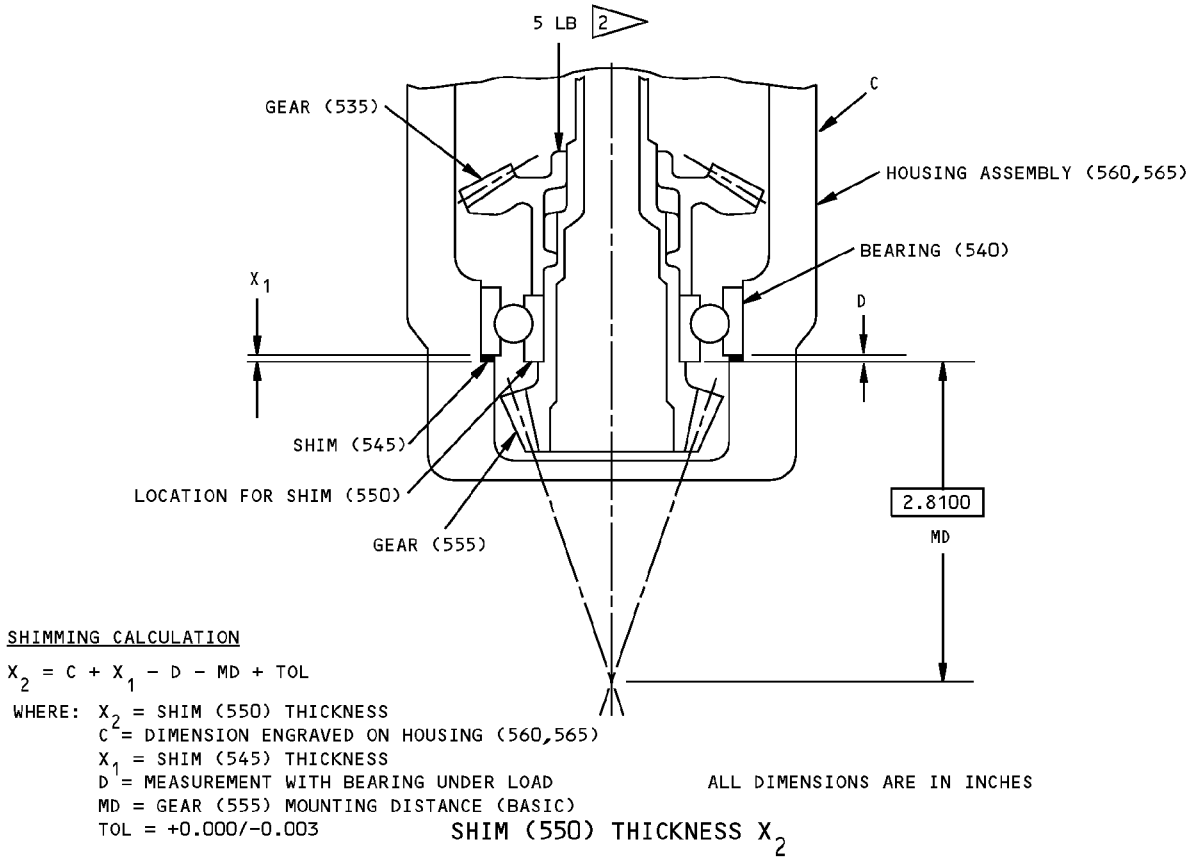
(c) Joint between support (395) and housing (560 or 565)

(d) Joint between cover (505) and housing (560 or 565)

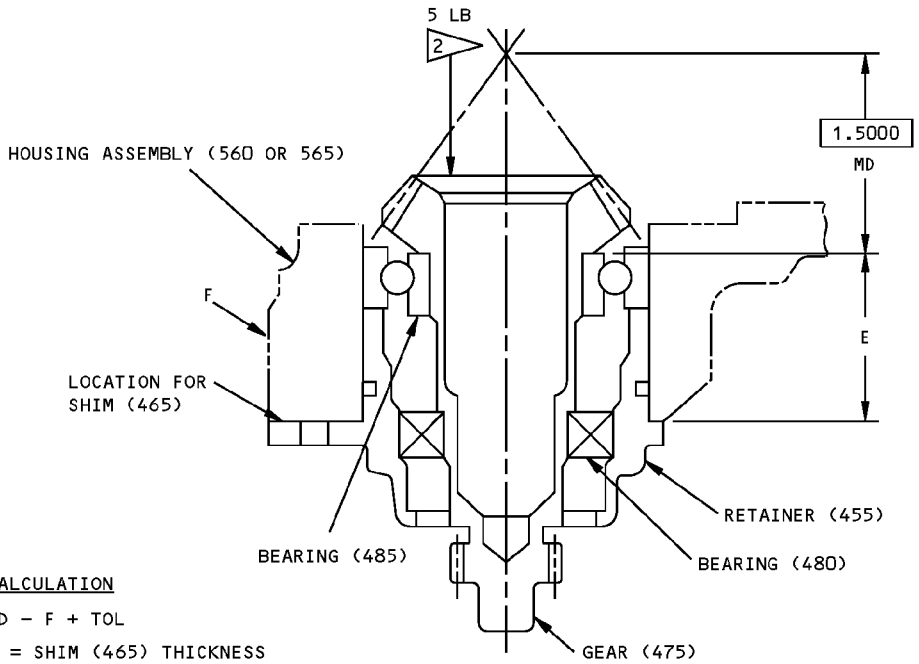
(e) Joints between retainers (455) and housing (560 or 565)

(f) Joints between retainers (80, 105), pins (110), and housing (40 or 45)





Shimming Diagrams
Figure 701 (Sheet 1 of 3)



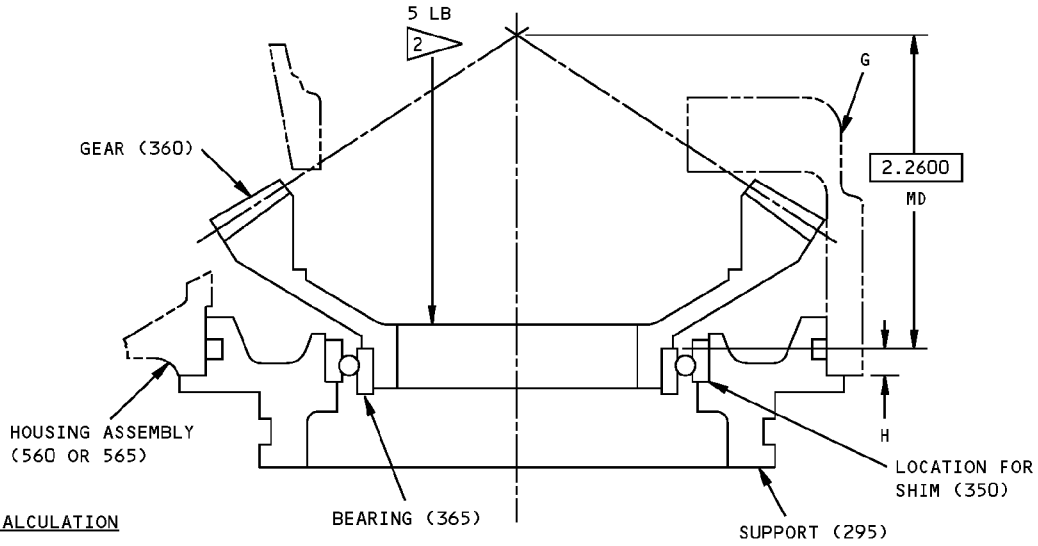
SHIMMING CALCULATION

$X_3 = E + MD - F + TOL$

WHERE: X_3 = SHIM (465) THICKNESS
E = MEASUREMENT WITH BEARING UNDER LOAD
F = DIMENSION ENGRAVED ON HOUSING (560,565)
MD = GEAR MOUNTING DISTANCE (BASIC)
TOL = +0.003/-0.000

ALL DIMENSIONS ARE IN INCHES

SHIM (465) THICKNESS X_3



SHIMMING CALCULATION

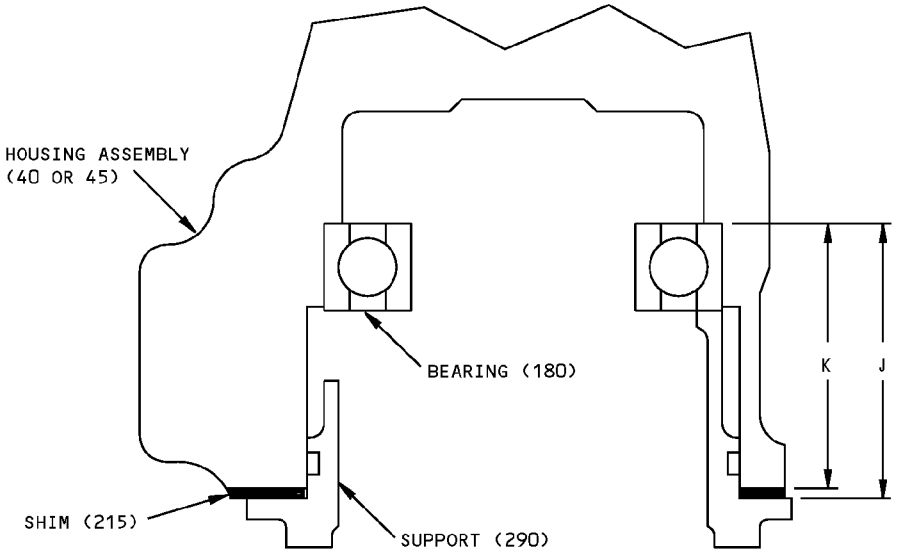
$X_4 = G - H - MD + TOL$

WHERE: X_4 = SHIM (350) THICKNESS
G = DIMENSION ENGRAVED ON HOUSING (560,565)
H = MEASUREMENT WITH BEARING UNDER LOAD
MD = GEAR MOUNTING DISTANCE (BASIC)
TOL = +0.000/-0.003

ALL DIMENSIONS ARE IN INCHES

SHIM (350) THICKNESS X_4

Shimming Diagrams
Figure 701 (Sheet 2 of 3)



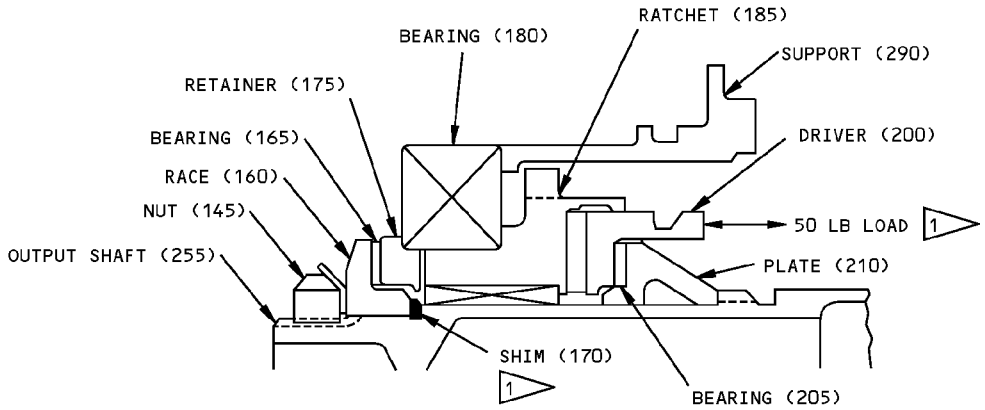
SHIMMING CALCULATION

X_5 = J − K − INTERFERENCE

WHERE: X_5 = SHIM (215) THICKNESS
J = MEASUREMENT WITH BEARING POSITIONED ON SUPPORT
K = MEASUREMENT ON HOUSING
INTERFERENCE = 0.001–0.003

ALL DIMENSIONS ARE IN INCHES

SHIM (215) THICKNESS X_5



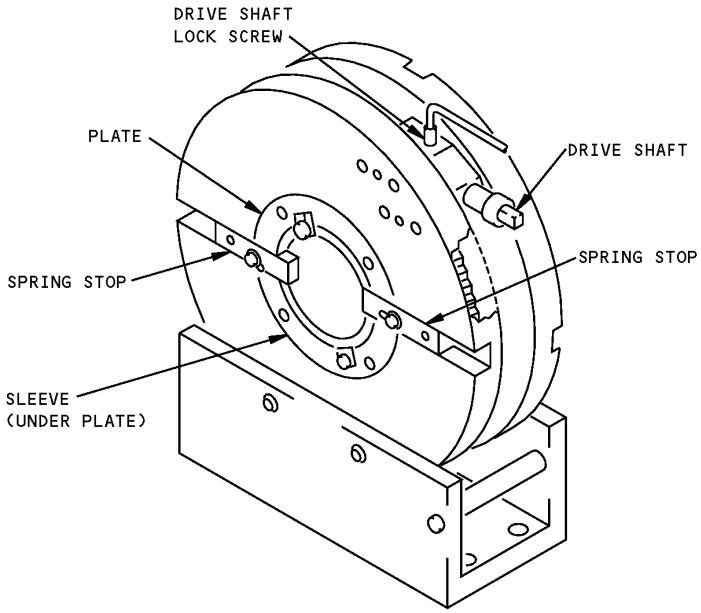
1 ADJUST THICKNESS OF SHIM (170) AS NECESSARY TO OBTAIN 0.002–0.005 AXIAL FREE PLAY UNDER 50 LB LOAD

2 APPLY A LOAD OF APPROXIMATELY 5 POUNDS TO SEAT BEARING

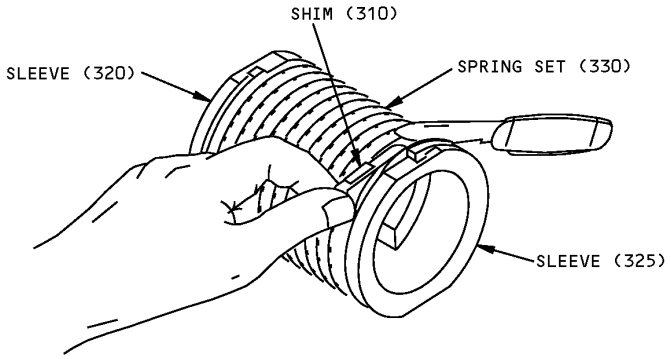
ALL DIMENSIONS ARE IN INCHES

SHIM (170) THICKNESS X_6

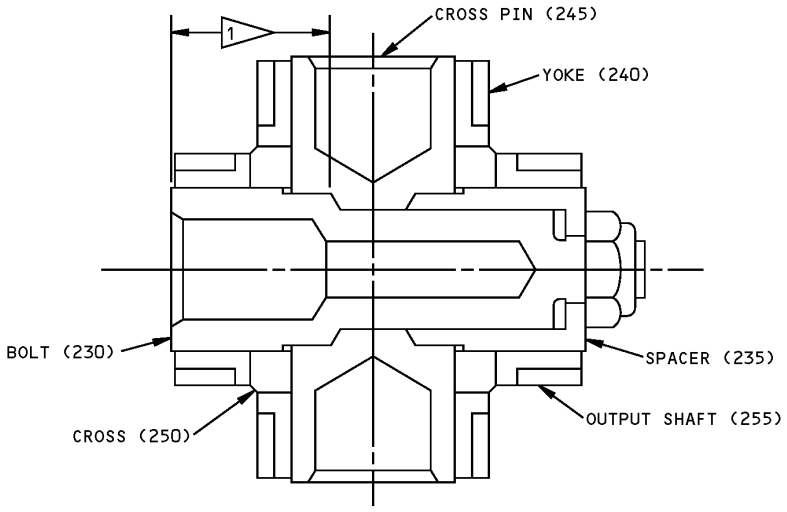
Shimming Diagrams
Figure 701 (Sheet 3 of 3)



Spring Expansion Fixture, ST6107
Figure 702



Spring Pack Shim Installation
Figure 703



CAUTION: INSTALL BOLT AND NUT ON OUTPUT SHAFT AND NOT THE YOKE OR INTERFERENCE WILL OCCUR.

1 KEEP BOLT SURFACES FREE OF CORROSION PREVENTIVE COMPOUND MIL-C-11796

Universal Joint Assembly
Figure 704

4. Storage

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D50090	Hydraulic Fluid - Petroleum Base NATO H-515 PETROLEUM BASE AIRCRAFT HYDRAULIC FLUID	MIL-PRF-5606H (NATO H-515)

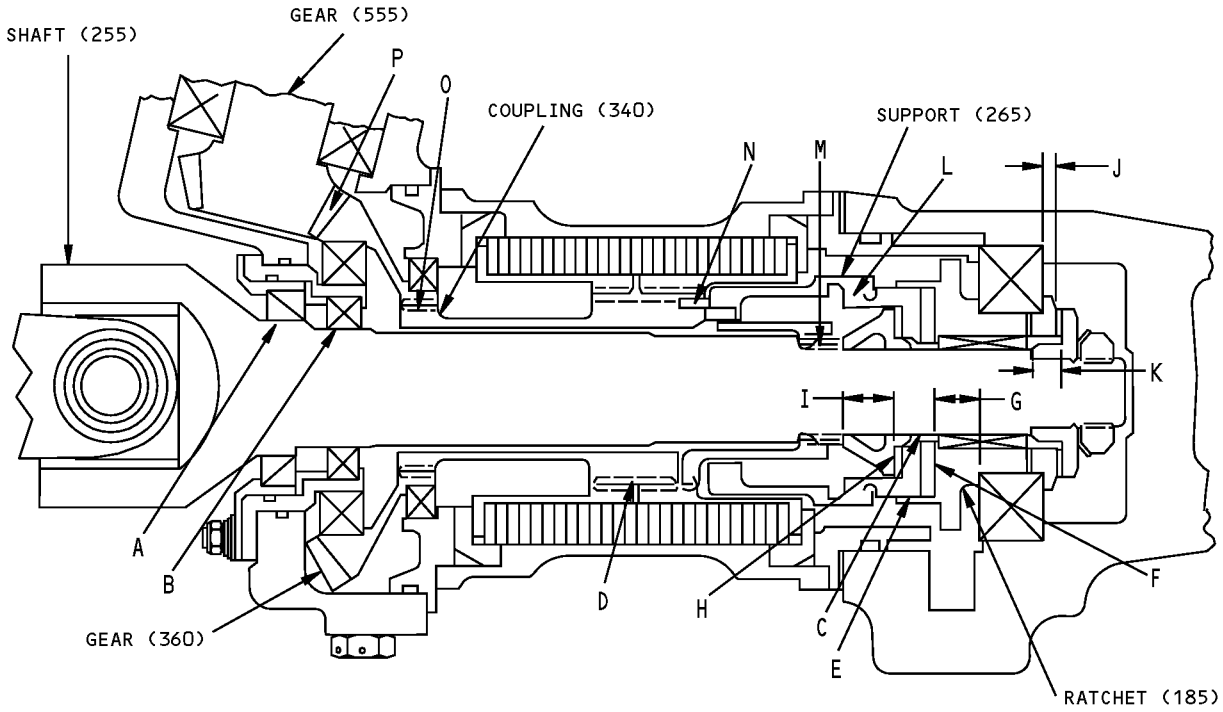
B. Procedure

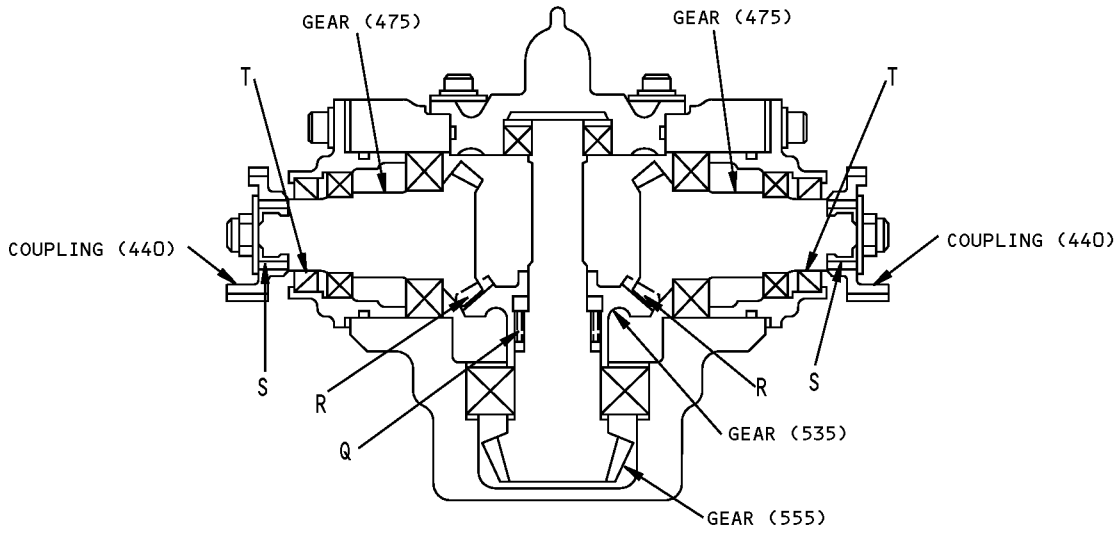
(1) Check that unit is filled to proper level with hydraulic fluid, D50090.

(2) To prevent damage to the universal joint assembly during handling, insert and secure a rubber or a styrofoam pad between the cross (250) and the yoke (240) and between the cross (250) and the output shaft (255). Pads are to be removed when transmission is installed on the airplane.

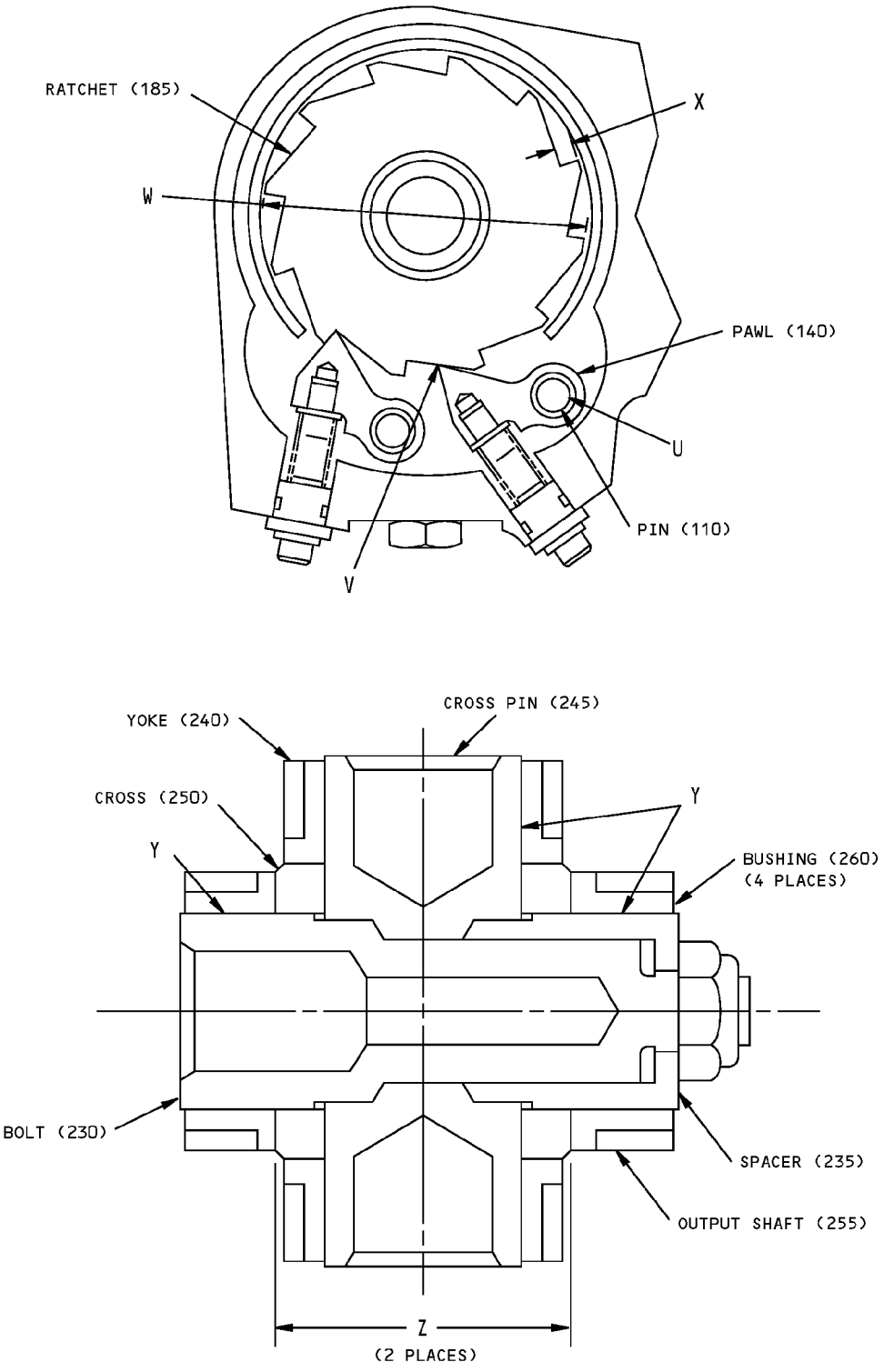
(3) Use standard industry practices and information in 20-44-02 to store this component.

FITS AND CLEARANCES





Fits and Clearances
Figure 801 (Sheet 1 of 4)



Fits and Clearances
Figure 801 (Sheet 2 of 4)

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	OD 255	1.561	1.563			1.559		
B	OD 255	1.3765	1.3774			1.3765		
C	OD 255	0.9995	1.0000			0.9992		
D	*[1] 315, 340	0.700	0.704			0.692		
E	ID 185 OD 200	2.470 2.465	2.472 2.467	0.003	0.007	2.463	2.474	0.011
F	*[2] 195	0.154	0.158			0.135		
G	*[3] 185	0.495	0.505			0.493		
H	*[3] 200	0.215	0.220			0.211		
I	*[3] 210	0.695	0.700			0.693		
J	*[3] 175	0.170	0.175			0.168		
K	*[4] 160	0.285	0.290				0.292	
L	*[5] 200, 265			0.0013	0.0067			0.0078
M	*[6] 255, 315			0.0015	0.0071			0.0090
N	*[7] 265, 340			0.0000	0.0140			0.0250
O	*[8] 340, 360			0.0015	0.0075			0.0090
P	*[9] 360, 555			0.0008	0.0033			0.0050
Q	*[10] 535, 555			0.0000	0.0137			0.0180
R	*[11] 475, 535			0.0009	0.0036			0.0054
S	*[12] 440, 475			0.0000	0.0052			0.0090
T	OD 475	0.970	0.972			0.966		
U	ID 135 OD 110	0.3125 0.3110	0.3130 0.3120	0.0005	0.0020	0.3100	0.3130	0.0030

Fits and Clearances
Figure 801 (Sheet 3 of 4)

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	
V	*[13] 140	0.050	0.070			0.075		
W	*[14] 185	3.085	3.105			3.075		
X	*[15] 185	0.190	0.210				0.225	
Y	ID 260 OD 230, 235, 245	1.2490 1.2453	1.2500 1.2460	0.0030	0.0047			
Z	*[3] 250	1.7560	1.7600					

ALL DIMENSIONS ARE IN INCHES

*[1] CHORDAL TOOTH THICKNESS MEASURED AT 2.125 PITCH DIA

*[2] THICKNESS

*[3] WIDTH

*[4] DEPTH OF STEP

*[5] SPLINE BACKLASH MEASURED AT 1.95-1.96 DIA ON SUPPORT (265) WITH DRIVER (200) FIXED

*[6] SPLINE BACKLASH MEASURED AT 1.1875 PITCH DIA ON SHAFT (255) WITH ADAPTER (315) FIXED

*[7] BACKLASH MEASURED AT 1.70 DIA OF SLOTS IN SUPPORT (265) OR LUGS ON COUPLING (340)

*[8] SPLINE BACKLASH MEASURED AT 1.8750 PITCH DIA ON GEAR (360) WITH COUPLING (340) FIXED

*[9] GEAR BACKLASH MEASURED AT 1.8750 SPLINE PITCH DIA ON GEAR (360) WITH GEAR (555) FIXED

*[10] SPLINE BACKLASH MEASURED AT 2.700 PITCH DIA ON GEAR (535) WITH GEAR (555) FIXED

*[11] GEAR BACKLASH MEASURED AT 0.8125 SPLINE PITCH DIA ON GEAR (475), WITH GEAR (535) FIXED BY LOCKING OUTPUT SHAFT (255) AND APPLYING 20 LB-IN. TORQUE TO OPPOSITE GEAR (475)

*[12] SPLINE BACKLASH MEASURED AT 1.6875 PITCH DIA ON COUPLING (440) WITH GEAR (475) FIXED

*[13] TIP RADIUS

*[14] OD OF RATCHET TEETH

*[15] STEP HEIGHT OF RATCHET TEETH

Fits and Clearances
Figure 801 (Sheet 4 of 4)

FOR TORQUE VALUES OF STANDARD FASTENERS, REFER TO 20-50-01			
ITEM NO. IPL FIG. 1	NAME	TORQUE	
		POUND-INCHES	POUND-FEET
10	NUT	300-500	
25, 30	BOLT	450-550	
145	NUT	200-240	
270	NUT	180-250	
375	NUT	50-70	
430	NUT	160-190	
445, 490	BOLT	80-100	

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-5461	Adapter - Torque Wrench	ST6105-1	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
60380	TORRINGTON CO BEARINGS DIV SUBSIDIARY OF INGERSOLL-RAND CORP 59 FIELD STREET PO BOX 1008 TORRINGTON, CONNECTICUT 06790-1008 FORMERLY TORRINGTON BEARING COMPANY
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

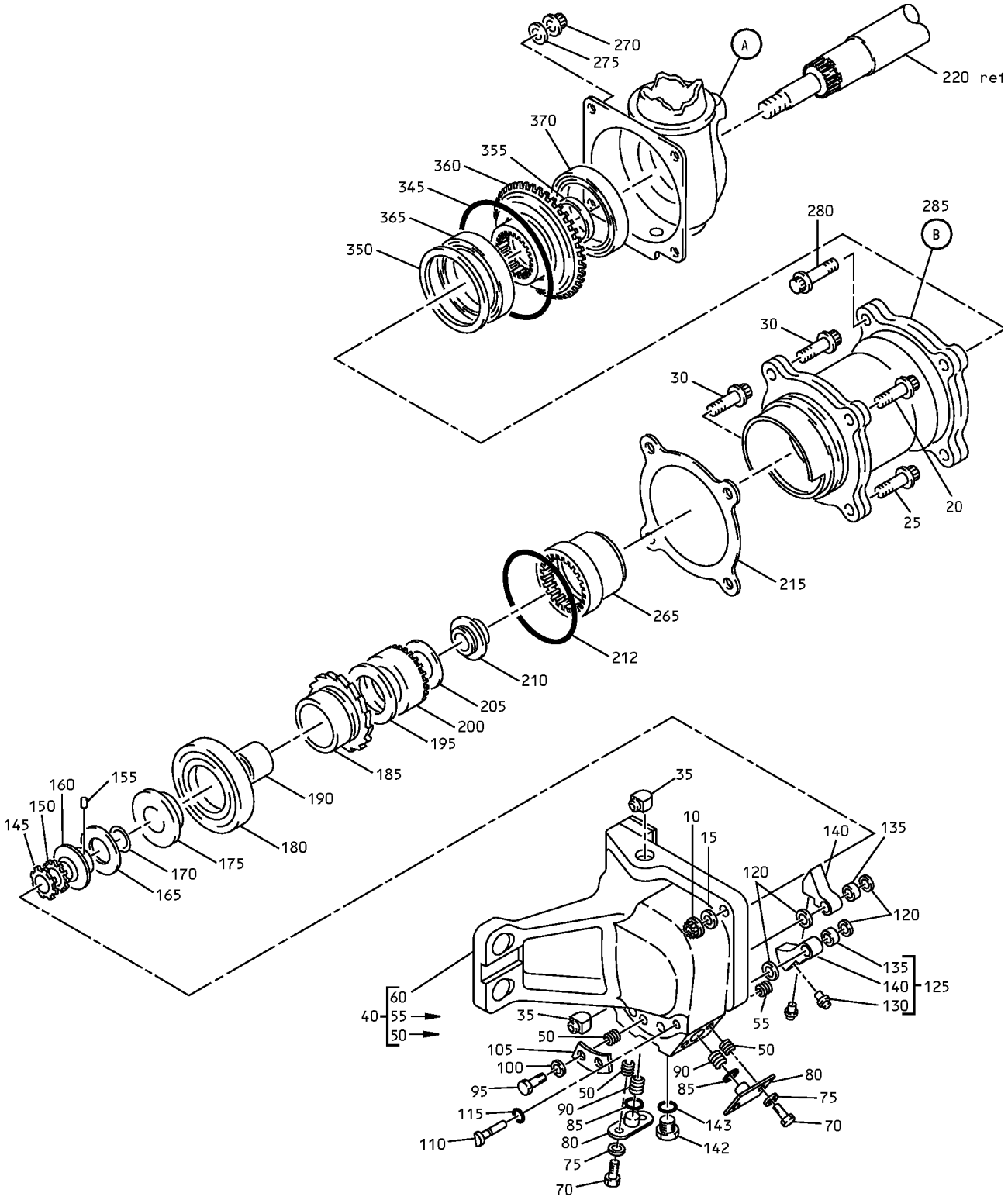
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
10-61899-22		1	260	4
111GE		1	365	1
175773		1	340	1
175773-1		1	340A	1
176278-X		1	310	AR
182592-1		1	285	1
182593-1		1	300	1
182594-1		1	290	1
182595-1		1	335A	1
182595-2		1	335	1
182596-1		1	295	1
182599-1		1	320	1
182599-2		1	320A	1
182601-1		1	325	1
182601-2		1	325A	1
182602-1		1	315	1
182602-2		1	315A	1
182603-1		1	305	2
182692-1		1	330B	1
182692-2		1	330A	1
2-039N304-7		1	420A	1
2-039N304-75		1	420	1
2-045N304-7		1	283A	2
2-045N304-75		1	283	2
2-156N304-7		1	345A	1
2-156N304-75		1	345	1
21959-0269		1	470A	1
21959-0700		1	405A	1
65-50262-10		1	580	1
65-50262-9		1	575	1
65-50274-11		1	560	1
65-50274-12		1	565	1
65C25532-1		1	440	2
65C27502-3		1	1	RF

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
65C27502-4		1	1A	RF
65C27502-5		1	1B	RF
65C27507-3		1	5	RF
65C27507-4		1	5A	RF
65C27507-8		1	5B	RF
65C27509-2		1	220	1
65C27510-1		1	255	1
65C27510-2		1	255A	1
65C27510-3		1	255B	1
65C27511-1		1	60	1
65C27511-2		1	65	1
66-23901-2		1	140A	1
66-23901-3		1	140	1
66-23908-1		1	130	1
66-23929-2		1	120	4
66-23937-1		1	90	2
66-23946-1		1	545	1
66-24700-1		1	550	1
66-24715-1		1	435	2
66-24717-2		1	110A	2
66-24717-3		1	110	2
66-24728-2		1	105	1
66-24729-2		1	80	2
66-24736-2		1	125	2
66-25126-1		1	135	1
66-25130-2		1	510	1
69-37634-5		1	505B	1
69-37634-7		1	505A	1
69-37634-8		1	505	1
69-37663-2		1	265A	1
69-37663-3		1	265	1
69-37685-4		1	500	1
69-37696-4		1	455	2
69-52404-1		1	475A	2
69-52404-2		1	475	2

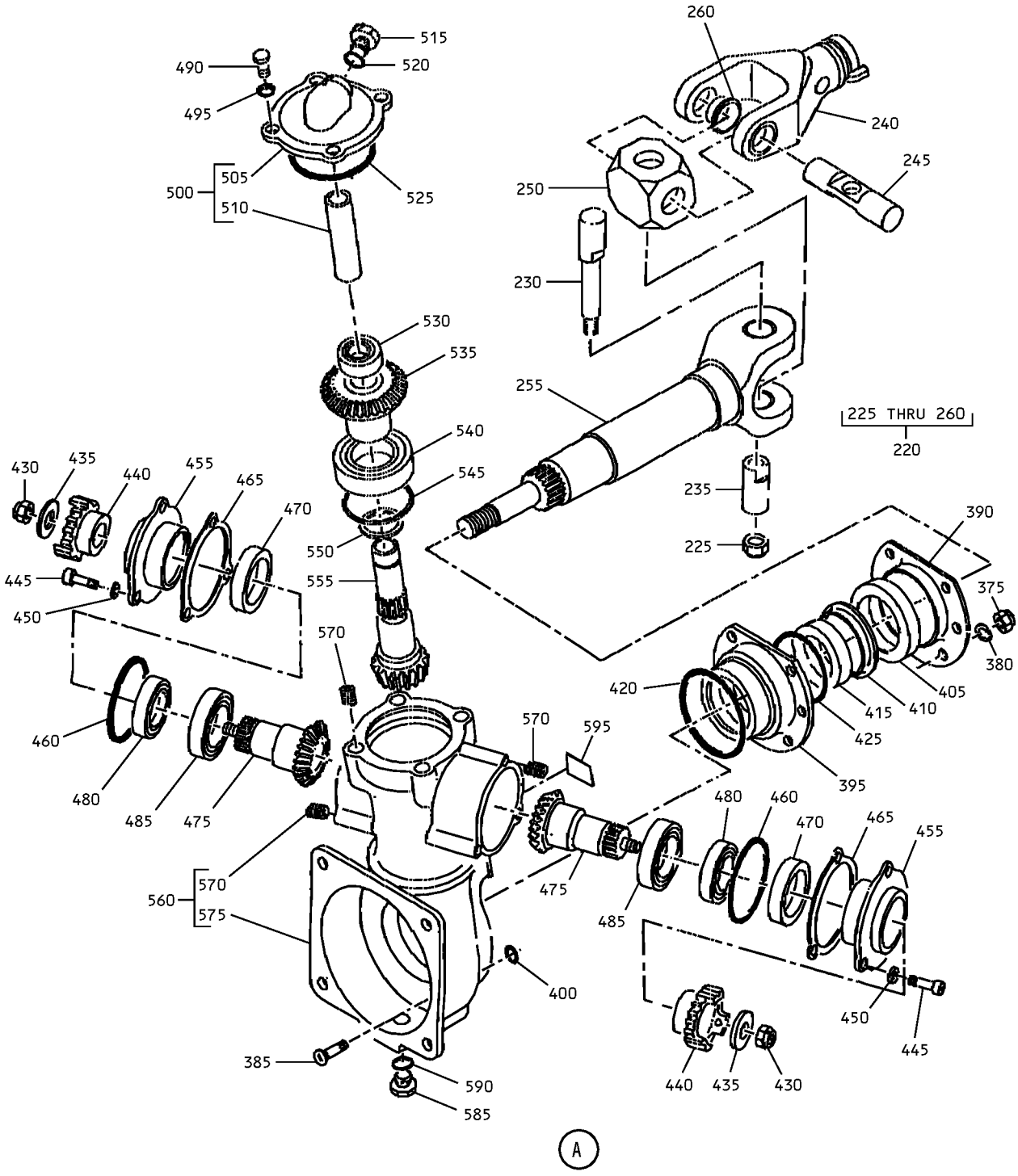
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
69-52405-1		1	535A	1
69-52405-2		1	535	1
69-52406-1		1	555B	1
69-52406-2		1	555A	1
69-52406-3		1	555	1
69-52410-1		1	360B	1
69-52410-2		1	360A	1
69-52410-3		1	360	1
69-52425-1		1	465	2
69-52429-1		1	175	1
69-52433-1		1	200	1
69-52436-1		1	160	1
69-52438-1		1	210	1
69-52440-1		1	185A	1
69-52440-2		1	185	1
69-52442-1		1	145	1
69-52443-1		1	195	1
69-52444-1		1	170	1
69-52450-1		1	350	1
69-52452-1		1	215	1
69-52457-17		1	40	1
69-52457-18		1	45	1
69-52461-1		1	595	1
69-62733-4		1	395	1
69-62733-5		1	395A	1
69-62757-3		1	390	1
69-62758-1		1	410	1
69-73393-12		1	405B	1
69-73393-2		1	470	2
69-73393-5		1	405	1
69-73393-9		1	470B	1
69-73605-1		1	240	1
69-73605-2		1	240A	1
69-73605-3		1	240B	1
69-73606-1		1	230	1

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
69-73607-1		1	245	1
69-73607-2		1	245A	1
69-73608-1		1	235	1
69-73609-1		1	250	1
9209H		1	180	1
AFDU20-13-22		1	260	4
AJF20A122DU		1	260	4
AN122691		1	155	1
AN960-416		1	450	6
AN960PD10		1	75	4
		1	100	2
AN960PD416		1	380	7
		1	495	4
AN960PD516		1	275	4
BACB10AZ30		1	540	1
BACB10BA17		1	530	1
BACB10BA30		1	485	2
BACB10BB25		1	480	2
BACB10BB60		1	370	1
BACB30JC8-11		1	385	7
BACB30LE5-12		1	280A	4
BACB30LE6-10		1	30A	2
BACB30LE6-14		1	20A	1
BACB30LE6H6		1	25A	1
BACB30MT5T12		1	280	4
BACB30MT6HT6		1	25	1
BACB30MT6T10		1	30	2
BACB30MT6T14		1	20	1
BACN10HR5		1	270	4
BACN10HR6		1	10	1
BACN10JC8		1	225	1
BACW10BN6P		1	15	1
GR209SD601		1	180A	1
HDF007P3		1	415	1
HDFZZ007-9		1	415A	1

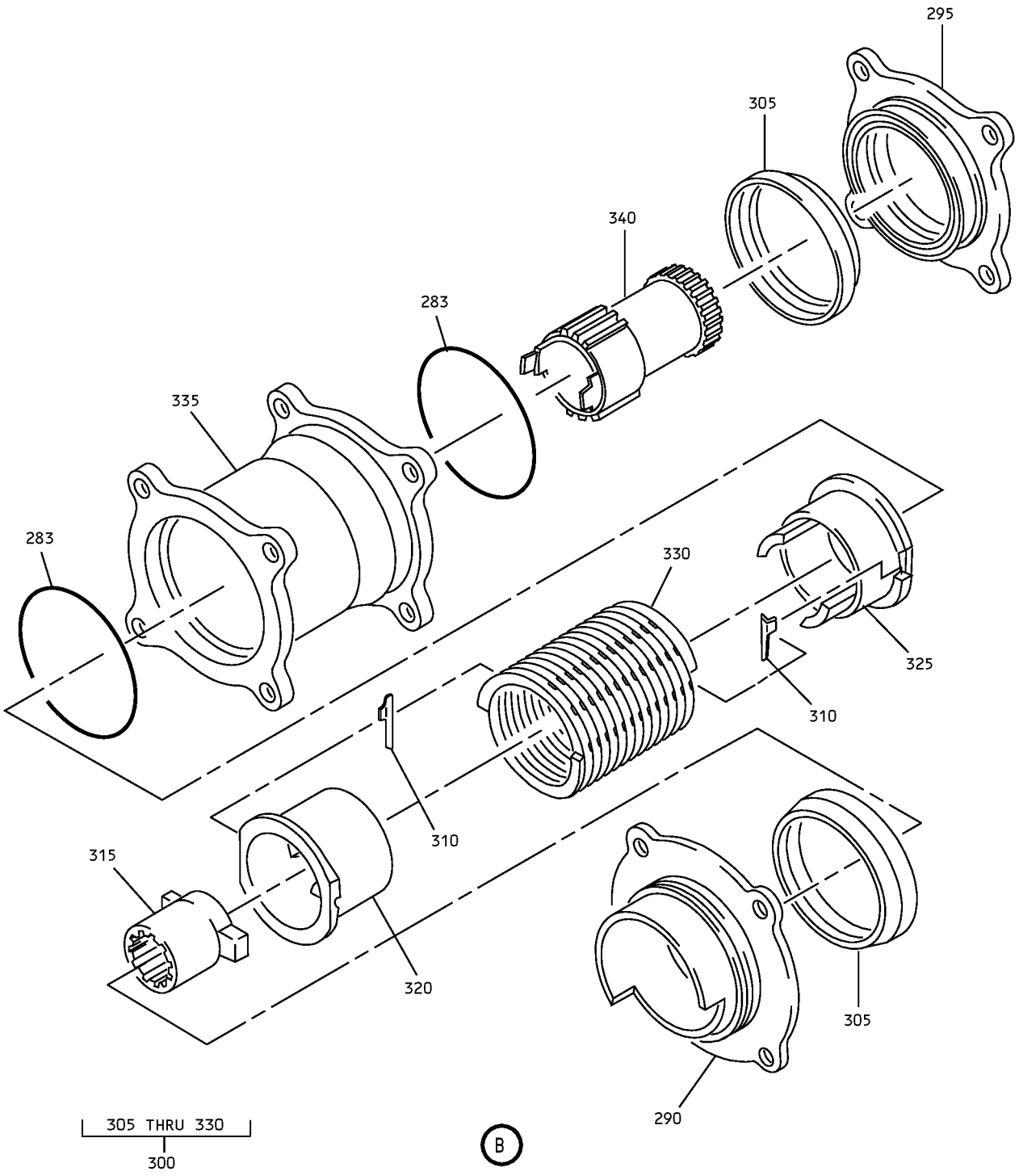
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
HJF20DU111		1	260	4
J1616		1	190	1
MS124695		1	50	6
MS124696		1	570	10
MS124698		1	55	1
MS172275		1	150	1
MS21042L4		1	375	7
MS21042L6		1	430	2
MS21208F1-15		1	50A	6
MS21208F4-15		1	570A	10
MS21208F6-15		1	55A	1
MS24391D4L		1	142	1
		1	515	1
		1	585	1
MS28775-009		1	115	2
MS28775-010		1	400	7
MS28775-012		1	85	2
MS28775-135		1	460	2
MS28775-143		1	425	1
MS28775-146		1	525	1
MS28775-237		1	212	1
MS28778-4		1	143	1
		1	520	1
		1	590	1
NAS1351-3H6P		1	70	4
		1	95	2
NAS1351-4H12P		1	445	6
		1	490	4
NAS577-6A		1	35	2
NTA2031		1	165	1
		1	205	1
RR187		1	355	1



Trailing Edge Flap Drive System No. 2 and 7 Transmission Assemblies
IPL Figure 1 (Sheet 1 of 3)



Trailing Edge Flap Drive System No. 2 and 7 Transmission Assemblies
IPL Figure 1 (Sheet 2 of 3)



Trailing Edge Flap Drive System No. 2 and 7 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	65C27502-3		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 2	A	RF
–1A	65C27502-4		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 2	B	RF
–1B	65C27502-5		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 2	E	RF
–5	65C27507-3		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 7	C	RF
–5A	65C27507-4		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 7	D	RF
–5B	65C27507-8		TRANSMISSION ASSY-TRAILING EDGE FLAP DRIVE SYSTEM NO. 7	F	RF
10	BACN10HR6		. NUT		1
15	BACW10BN6P		. WASHER		1
20	BACB30MT6T14		. BOLT	A-D	1
–20A	BACB30LE6-14		. BOLT	E, F	1
25	BACB30MT6HT6		. BOLT	A-D	1
–25A	BACB30LE6H6		. BOLT	E, F	1
30	BACB30MT6T10		. BOLT	A-D	2
–30A	BACB30LE6-10		. BOLT	E, F	2
35	NAS577-6A		. NUT-BARREL		2
40	69-52457-17		. HOUSING ASSY	A, B, E	1
–45	69-52457-18		. HOUSING ASSY	C, D, F	1
50	MS124695		. . INSERT (OPT ITEM 50A)		6
–50A	MS21208F1-15		. . INSERT (OPT ITEM 50)		6
–55	MS124698		. . INSERT (OPT ITEM 55A)		1
–55A	MS21208F6-15		. . INSERT (OPT ITEM 55)		1
60	65C27511-1		. . HOUSING	A, B, E	1
–65	65C27511-2		. . HOUSING	C, D, F	1
70	NAS1351-3H6P		. BOLT		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–					
75	AN960PD10		. WASHER		4
80	66-24729-2		. RETAINER		2
85	MS28775-012		. PACKING		2
90	66-23937-1		. SPRING		2
95	NAS1351-3H6P		. BOLT		2
100	AN960PD10		. WASHER		2
105	66-24728-2		. PLATE		1
110	66-24717-3		. PIN (OPT ITEM 110A)		2
–110A	66-24717-2		. PIN (OPT ITEM 110)		2
115	MS28775-009		. PACKING		2
120	66-23929-2		. WASHER		4
125	66-24736-2		. PAWL ASSY		2
130	66-23908-1		. . GUIDE		1
135	66-25126-1		. . BEARING		1
140	66-23901-3		. . PAWL (OPT ITEM 140A)		1
–140A	66-23901-2		. . PAWL (OPT ITEM 140)		1
142	MS24391D4L		. PLUG		1
143	MS28778-4		. PACKING		1
145	69-52442-1		. NUT		1
150	MS172275		. WASHER		1
155	AN122691		. DOWEL		1
160	69-52436-1		. RACE		1
165	NTA2031		. BEARING (V60380)		1
170	69-52444-1		. SHIM		1
175	69-52429-1		. RETAINER		1
180	9209H		. BEARING (V38443) (OPT ITEM 180A)		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–					
–180A	GR209SD601		. BEARING (OPT ITEM 180)		1
185	69-52440-2		. RATCHET (OPT ITEM 185A)		1
–185A	69-52440-1		. RATCHET (OPT ITEM 185)		1
190	J1616		. BEARING (V60380)		1
195	69-52443-1		. WASHER		1
200	69-52433-1		. DRIVER		1
205	NTA2031		. BEARING (V60380)		1
210	69-52438-1		. PLATE		1
212	MS28775-237		. PACKING		1
215	69-52452-1		. SHIM		1
220	65C27509-2		. UNIVERSAL JOINT ASSY		1
225	BACN10JC8		. . NUT		1
230	69-73606-1		. . BOLT		1
235	69-73608-1		. . SPACER		1
240	69-73605-1		. . YOKE-BALLSCREW (OPT ITEM 240A, 240B)		1
–240A	69-73605-2		. . YOKE-BALLSCREW (OPT ITEM 240, 240B)		1
–240B	69-73605-3		. . YOKE-BALLSCREW (OPT ITEM 240, 240A)		1
245	69-73607-1		. . PIN-CROSS (OPT ITEM 245A)		1
–245A	69-73607-2		. . PIN-CROSS (OPT ITEM 245)		1
250	69-73609-1		. . CROSS-TRUNNION		1
255	65C27510-1		. . SHAFT-OUTPUT (OPT ITEM 255A, 255B)		1
–255A	65C27510-2		. . SHAFT-OUTPUT (OPT ITEM 255, 255B)		1
–255B	65C27510-3		. . SHAFT-OUTPUT (OPT ITEM 255, 255A)		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–					
260	AFDU20-13-22		. . BUSHING (V15860) (SPEC 10-61899-22) (OPT AJF20A122DU (V50294)) (OPT HJF20DU111 (V02758))		4
265	69-37663-3		. SUPPORT (OPT ITEM 265A)		1
–265A	69-37663-2		. SUPPORT (OPT ITEM 265)		1
270	BACN10HR5		. NUT		4
275	AN960PD516		. WASHER		4
280	BACB30MT5T12		. BOLT	A-D	4
–280A	BACB30LE5-12		. BOLT	E, F	4
283	2-045N304-75		. PACKING (V83259) (OPT ITEM 283A)		2
–283A	2-045N304-7		. PACKING (V83259) (OPT ITEM 283)		2
285	182592-1		. BRAKE ASSY-TORQUE (V71791)		1
290	182594-1		. . SUPPORT		1
295	182596-1		. . SUPPORT		1
300	182593-1		. . PACK ASSY-SPRING		1
305	182603-1		. . . RING		2
310	176278-X		. . . SHIM		AR
315	182602-1		. . . ADAPTER (OPT ITEM 315A)		1
–315A	182602-2		. . . ADAPTER (OPT ITEM 315)		1
320	182599-1		. . . SLEEVE (OPT ITEM 320A)		1
–320A	182599-2		. . . SLEEVE (OPT ITEM 320)		1
325	182601-1		. . . SLEEVE (OPT ITEM 325A)		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–					
–325A	182601-2		. . . SLEEVE (OPT ITEM 325)		1
330	182598		DELETED		1
–330A	182692-2		. . . SET-SPRING (OPT ITEM 330B)		1
–330B	182692-1		. . . SET-SPRING (OPT ITEM 330A)		1
335	182595-2		. . HOUSING (OPT ITEM 335A)		1
–335A	182595-1		. . HOUSING (OPT ITEM 335)		1
340	175773		. . COUPLING (OPT ITEM 340A)		1
–340A	175773-1		. . COUPLING (OPT ITEM 340)		1
345	2-156N304-75		. PACKING (V83259) (OPT ITEM 345A)		1
–345A	2-156N304-7		. PACKING (V83259) (OPT ITEM 345)		1
350	69-52450-1		. SHIM		1
355	RR187		. RING (V80756)		1
360	69-52410-3		. GEAR (OPT ITEM 360A, 360B)		1
–360A	69-52410-2		. GEAR (OPT ITEM 360, 360B)		1
–360B	69-52410-1		. GEAR (OPT ITEM 360, 360A)		1
365	111GE		. BEARING (V21335)		1
370	BACB10BB60		. BEARING		1
375	MS21042L4		. NUT		7
380	AN960PD416		. WASHER		7
385	BACB30JC8-11		. SCREW		7
390	69-62757-3		. RETAINER		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–					
395	69-62733-4		. SUPPORT (OPT ITEM 395A)		1
–395A	69-62733-5		. SUPPORT (OPT ITEM 395)		1
400	MS28775-010		. PACKING		7
405	69-73393-5		. SEAL (OPT ITEM 405B)		1
–405A	21959-0700		. SEAL (V73680) (REPLACED BY ITEM 405)	A, C	1
–405B	69-73393-12		. SEAL (OPT ITEM 405)		1
410	69-62758-1		. SPACER		1
415	HDF007P3		. BEARING (V40920) (OPT ITEM 415A)		1
–415A	HDFZZ007-9		. BEARING (WITH SEALS REMOVED) (V40920) (OPT ITEM 415)		1
420	2-039N304-75		. PACKING (V83259) (OPT ITEM 420A)		1
–420A	2-039N304-7		. PACKING (V83259) (OPT ITEM 420)		1
425	MS28775-143		. PACKING		1
430	MS21042L6		. NUT		2
435	66-24715-1		. WASHER		2
440	65C25532-1		. COUPLING		2
445	NAS1351-4H12P		. BOLT		6
450	AN960-416		. WASHER		6
455	69-37696-4		. RETAINER		2
460	MS28775-135		. PACKING		2
465	69-52425-1		. SHIM		2
470	69-73393-2		. SEAL (OPT ITEM 470B)		2

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
470A	21959-0269		. SEAL (V73680) (REPLACED BY ITEM 470)	A, C	1
470B	69-73393-9		. SEAL (OPT ITEM 470)		1
475	69-52404-2		. GEAR (OPT ITEM 475A)		2
–475A	69-52404-1		. GEAR (OPT ITEM 475)		2
480	BACB10BB25		. BEARING		2
485	BACB10BA30		. BEARING		2
490	NAS1351-4H12P		. BOLT		4
495	AN960PD416		. WASHER		4
500	69-37685-4		. COVER/TUBE ASSY		1
505	69-37634-8		. . COVER (OPT ITEM 505A, 505B)		1
–505A	69-37634-7		. . COVER (OPT ITEM 505, 505B)		1
–505B	69-37634-5		. . COVER (OPT ITEM 505, 505A)		1
510	66-25130-2		. . TUBE		1
515	MS24391D4L		. PLUG		1
520	MS28778-4		. PACKING		1
525	MS28775-146		. PACKING		1
530	BACB10BA17		. BEARING		1
535	69-52405-2		. GEAR (OPT ITEM 535A)		1
–535A	69-52405-1		. GEAR (OPT ITEM 535)		1
540	BACB10AZ30		. BEARING		1
545	66-23946-1		. SHIM		1
550	66-24700-1		. SHIM		1
555	69-52406-3		. GEAR (OPT ITEM 555A, 555B)		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–					
–555A	69-52406-2		. GEAR (OPT ITEM 555, 555B)		1
–555B	69-52406-1		. GEAR (OPT ITEM 555, 555A)		1
560	65-50274-11		. HOUSING ASSY	A, B, E	1
–565	65-50274-12		. HOUSING ASSY	C, D, F	1
570	MS124696		. . INSERT (OPT ITEM 570A)		10
–570A	MS21208F4-15		. . INSERT (OPT ITEM 570)		10
575	65-50262-9		. . HOUSING	A, B, E	1
–580	65-50262-10		. . HOUSING	C, D, F	1
585	MS24391D4L		. PLUG		1
590	MS28778-4		. PACKING		1
595	69-52461-1		. NAMEPLATE		1

–Item not Illustrated