TO: ALL HOLDERS OF TRAILING EDGE FLAP DRIVE TRANSMISSION ASSEMBLIES NO. 1 AND 8 OVERHAUL MANUAL, 27-55-51

REVISION NO. 27, DATED MAR 1/05

HIGHLIGHTS

DESCRIPTION OF CHANGE	TOPICS AFFECTED												
	D & O	D / Assy	Cleaning	Insp/Chk	Repair	Assy	F/C	Test	T/Shooting	S/Tools	Storage	IPL	L/Overhaul
Added details to the lockout torque test to clarify requirements at minimum lockout and maximum lockout								X					

TRAILING EDGE FLAP DRIVE TRANSMISSION ASSEMBLIES NOS. 1 AND 8

27-55-51

BOEING P/N 65-50251-2, -4, -5, -6, -7
65-50258-2, -4, -5, -6, -7

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30472	Nov 15/67
27-1015, Rev 1		PRR 31291, -1	May 15/69
		PRR 31581	Nov 10/69
27-1048, Rev 2		PRR 32017	Jun 25/74
		PRR 32358	Sep 25/74

LIST OF EFFECTIVE PAGES

* Indicates pages revised, added or deleted in latest revision
F Indicates foldout pages - print one side only

	PAGE	DATE		PAGE	DATE		PAGE	DATE
	27-55-51			505	Jun 25/75			
	T-1	Sep 25/74		506	Jun 5/93			
	T-2	BLANK		507	Jun 5/88			
*	LEP-1	Mar 1/05		508	Sep 1/96			
	LEP-2	BLANK		509	May 15/69			
	T/C-1	Dec 10/70		510	May 15/69			
	T/C-2	BLANK		511	May 15/69			
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	101	Jun 5/93		514	BLANK			
	102	Jun 25/75		601	Jun 5/93			
	103	Jun 10/72		602	Jun 5/93			
	104	BLANK		603	Mar 1/04			
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	301	Jul 5/81		606	BLANK			
	302	BLANK		701	Nov 1/98			
	401	Mar 5/84	*	702	Mar 1/05			
	402	Mar 1/00		703	Mar 25/74			
	402A	Mar 5/93		704	Mar 25/74			
	402B	BLANK		801	Sep 5/91			
	403	Mar 5/93		802	BLANK			
	404	Mar 1/04		901	Dec 10/70			
	405	Dec 25/75		902	BLANK			
	406	Dec 25/75		1001	Jun 25/75			
	407	Mar 1/04		1002	BLANK			
	408	Dec 5/87		1101	Mar 1/04			
	409	Mar 1/04		1102	Mar 1/04			
	410	Jul 1/03		1103	Mar 1/04			
	411	Jun 25/73		1104	Jun 5/93			
	412	Jun 25/73		1105	Mar 1/04			
	413	Mar 5/86		1106	Mar 1/04			
	414	Mar 5/93		1107	Mar 1/04			
	415	Jul 5/79		1108	Mar 1/04			
	416	Mar 1/04		1109	Mar 1/04			
	416A	Mar 1/04		1110	BLANK			
	416B	BLANK						
	417	Jul 5/79						
	418	Sep 5/84						
	419	Mar 1/04						
	420	BLANK						
	501	May 15/69						
	502	Sep 1/96						
	503	May 15/69						
	504	Jun 25/75						

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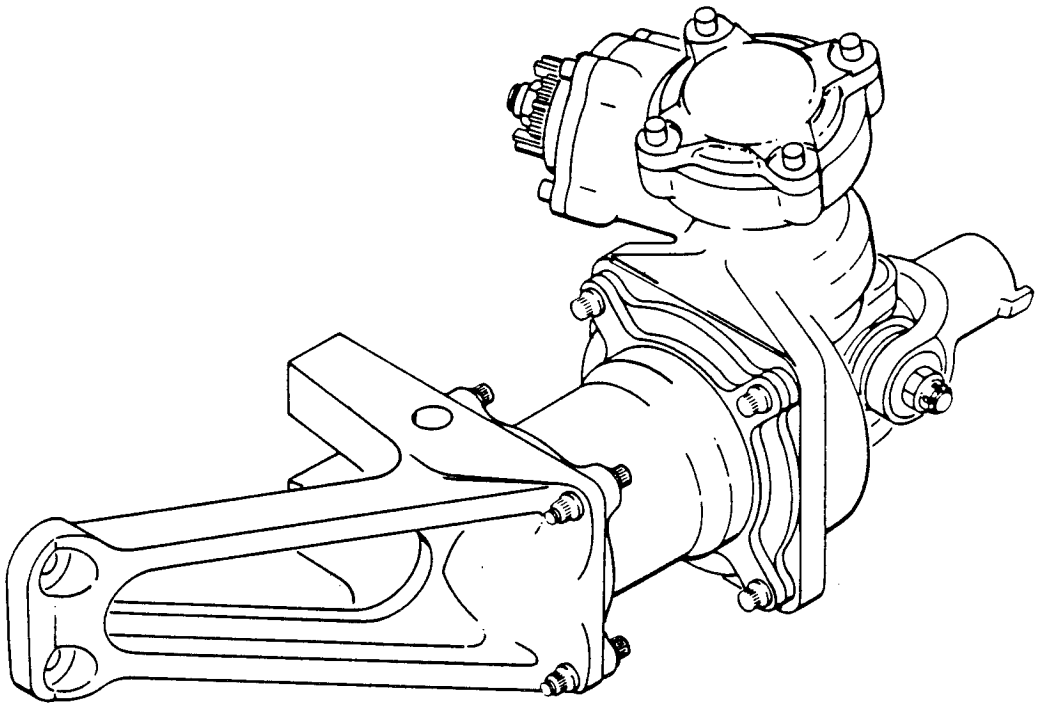
TRAILING EDGE FLAP DRIVE TRANSMISSION ASSEMBLIES NOS. 1 AND 8

Boeing Part Numbers: 65-50251-2, -4, thru -7
65-50258-2, -4, thru -7



ASSEMBLY 65-50251 SHOWN

Trailing Edge Flap Drive Transmission Assemblies Nos. 1 and 8
Figure 1

DESCRIPTION AND OPERATION

1. Description

   A. The trailing edge flap drive transmission assemblies Nos. 1 and 8 consist of four bevel gears and a torque brake assembly housed in a sealed, lubricant filled, housing. The bevel gears are bearing mounted. The torque brake assembly is installed around the output shaft. A universal joint assembly is provided at the end of the output shaft. A splined coupling is provided to drive the input shaft.

2. Operation

A. The trailing edge flap drive transmission assemblies Nos. 1 and 8 provide a change in direction and an off-set of the flap drive torque tubes rotary motion. Each assembly functions to transmit flap drive torque tube rotary motion to a ball screw and nut assembly. The torque brake assembly limits the amount of torque applied to the ball screw and nut assembly. The assemblies are located outboard on the outboard flaps.

3. Leading Particulars

Length -- 19.25 inches
Width -- 7.25 inches
Height -- 11.25 inches
Weight -- 30.0 pounds (wet)

DISASSEMBLY

1. General (Fig. 1101)

   A. Remove all lockwire.

   B. Remove plugs (1) and O-rings (2). Drain hydraulic fluid from assembly.

2. Disassembly (Fig. 1101)

   A. Disassemble universal joint assembly (3) as follows:

      (1) Remove nut (5), bolt (7) and spacer (8) from shaft (13).

      (2) Remove pin (9) and cross (10) from yoke (12).

      (3) If installed, remove tape (4) and placard (6) from yoke (12) and discard.

      NOTE: Do not remove bushings (11) from yoke (12) and shaft (13) unless replacement is necessary.

   B. Hold coupling (16) with Splined Coupling Wrench, F71228-500 or equivalent, and remove nut (14), washer (15) and coupling (16).

   C. Hold gear (75) fixed by wedging through drain hole of plug (1). Measure and note total backlash between gears (75) and (17). Measure backlash at pitch diameter of spline on gear (17). See Fig. 601 for backlash wear limit.

   D. Remove and disassemble torque brake assembly (57) as follows:

      (1) Remove nuts (41, 43), washers (44), bolts (42, 45) and housing (46) from assembly. Remove shim (48). Measure and note thickness of shim (48) to facilitate reassembly.

      (2) Straighten tangs of washer (49). Hold shaft (13) and, using Torque Wrench Adapter, ST6105-1, remove nut (50), washer (49), retainer (51) and adapter (53) from shaft (13). Discard washer (49).

      (3) Remove bearing (52) from adapter (53).

      (4) Tap end of output shaft (13) and remove shaft from housing (90) and from torque brake assembly (57).

      (5) Remove support (58) from housing (60) and remove O-rings (47, 70) from support (58).

(6) Remove nuts (54), washers (55), bolts (56) and torque brake assembly (57) from housing (90).

(7) Remove support (61) from housing (90). Remove O-rings (70, 71) and shim (72) from support (61). Measure and note thickness of shim (72) to facilitate reassembly.

(8) Carefully remove rings (64, 69) from housing (60). Remove spring pack assembly (62) from housing (60), using care not to distort or change relationship of spring ends. Remove shims (65).

NOTE: There may be two shims in each end, two shims in one end only, or no shims at all installed. Note number, location and thickness of shims to facilitate reassembly.

(9) Open center of Spring Pack Assembly Jig, ST6107, and slide assembled spring pack (62) into jig. Check that ends of spring set (68) contact locking lugs on bottom of circular portion of jig. Use Torque Bar, PT49001 to rotate upper ends of spring set in line with locking lugs of jig. Press lugs into place to restrain springs. Tighten set screws to prevent lugs from retracting.

(10) When spring ends are securely retained, turn cranks on assembly jig as evenly as possible to expand springs. Remove adapter (58A) and sleeves (66, 67).

(11) Rotate cranks in reverse direction to relieve spring load. Loosen set screws, back off locking lugs, and remove spring set (68) from jig.

NOTE: Spring set (68) is a matched assembly of two springs. Identify as matched parts.

E. Remove gear (75) as follows:

(1) Remove gear (75) and attached parts and coupling (59) from housing (90).

(2) Use needle-nosed pliers to bend up one end of retaining ring (74) and work ring around grooves in gear (75) and coupling (59) until ring is free. Pull coupling (59) from assembled parts.

NOTE: Coupling (59) is part of torque brake assembly (57).

(3) Remove bearings (73, 76) from gear (75).

(4) Hold gear (40) fixed by wedging between gear teeth and housing (90), pushing gear (40) towards gear (36). Measure and note backlash at pitch diameter of spline on gear (17). Refer to figure 601 for backlash wear limit.

F. Remove gear (17) as follows:

(1) Remove bolts (18), washers (19) and retainer (20) from housing (90).

(2) Remove O-ring (21) and seal (22) from retainer (20).

(3) Remove O-ring (23), backup rings (24), spacer (25) and shim (26). Measure and note thickness of shim (26) to facilitate reassembly.

(4) Remove gear (17) and attached parts from housing (90).

(5) Remove bearings (27 and 29) and spacer (28) from gear (17).

G. Remove gear (40) as follows:

(1) Remove bolts (30), washers (31) and cover (32) from housing (90).

(2) Remove O-ring (33) and shim (34) from cover (32). Measure and note thickness of shim (34) to facilitate reassembly.

(3) Remove gear (40) and attached parts from housing (90).

(4) Remove bearing (35), gear (36), shim (37), spacer (38) and bearing (39) from gear (40). Measure and note thickness of shim (37) to facilitate reassembly.

H. Remove nuts (77), washers (78), screws (79), retainer (81), support (82) and O-rings (80 and 86) from housing (90). For P/N 65-50251-7 and 65-50258-7 assemblies, remove O-ring (86A) from support.

J. Remove bearing (83), spacer (84) and seal (85) from support (82).

NOTE: Do not remove screws (87), nameplate (88) or inserts (91) from housing (90), unless repair or replacement is necessary. Spacer (84) is not used on P/N 65-50251-7 and 65-50258-7 assemblies.

CLEANING

1. General

   A. Wash and rinse all metal parts, except bearings, in dry cleaning solvent, Specification P-D-680 or equivalent.

      NOTE: Use stiff bristle brush to remove dirt and grease. Clean all passages and bores.

   B. Dry parts with clean, lint-free cloth or with moisture-free compressed air.

   C. For further information, refer to "General Cleaning Procedures," Subject 20-30-03.

2. Bearings (See figure 1101.)

   A. Clean bearings in accordance with "Cleaning and Relubricating Antifriction Bearings," Subject 20-30-01.

   B. Lubricate all bearings, except bearing (83), with hydraulic fluid, Specification MIL-H-5606.

INSPECTION/CHECK

1. Check all parts for obvious defects in accordance with standard industry practices. Refer to Fits and Clearances for design dimensions and wear limits.

2. Penetrant check per 20-20-02 -- retainers (20, 81), cover (32), housings (46, 90), supports (58, 61).

3. Magnetic particle check per 20-20-01 -- bolt (7), yoke (12), shaft (13), couplings (16, 59), gears (17, 36, 40, 75), adapters (53, 58A), housing (60), rings (64, 69), sleeves (66, 67), spring set (68), support (82).

REPAIR

1. Repair

   A. Repair minor defects in accordance with standard industry practices. Refer to 20-10-01 for applicable instructions for rework and repair of high strength steel parts (180 ksi and above).

   B. Cross (10) (Fig. 401) ID's for bolt (7), spacer (8) and pin (9).

      (1) Machine as required to remove defects, observing 1.0271 max rework diameter. Machined Finish to be at least 63 microinch. No step or mismatch allowed.

      (2) Shot-peen using size and intensity specified.

      (3) Nickle plate per 20-42-09, 0.004-0.006 single plate thickness.

      (4) Chrome plate per 20-42-03.

      (5) Machine to design diameter of 0.9962-0.9971 per 20-10-04. Total plating thickness (nickle and chrome) after machining to be 0.015 max. Machined Finish to be at least 63 microinch.

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

   C. Bolt (7), spacer (8), pin (9), cross (10) exterior dimensions and coupling (16) - (Fig. 401)

      (1) Machine, as required within work limits shown, to remove corrosion or defects. Observe surface finish requirements. Remove burrs and sharp edges. Smoothly blend all mismatch areas.

      (2) Stress relieve per Fig. 406.

      (3) Shot-peen using shot size and intensity indicated.

      (4) Restore reworked surface, unless otherwise noted, by plating and machining to design dimensions and finish noted.

   D. Torque Brake Rework (57) (Fig. 402)

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

      (1) To shift torque lockout level to a higher value, machine housing (60) surface as indicated on repair figure. Maintain finish and dimensions shown.

(2) To shift torque lockout level to a lower value.

(a) Machine spring set (68) and stress relieve as indicated (note amount of material removed).

(b) Buildup OD of sleeve with chrome plate as required to obtain finish diameter (after machining) equal to original OD plus amount that ID of spring set (68) was increased (+0.0000/-0.0005). A shift of torque lockout level relatively affects maximum or minimum lockout levels a corresponding amount.

I E. Shaft (13) bearing and seal OD, lug holes (Fig. 404); Support (82) OD (Fig. 405)

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

(2) Machine as required within repair limits to remove defects.

(3) Shot peen using size and intensity specified.

(4) Chrome plate per SOPM 20-42-03.

(5) Machine to design dimensions and finish shown.

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

F. Yoke (12) (Fig. 403)

(1) Oversize bolt hole repair

(a) Machine bolt holes per SOPM 20-10-02 to dimension shown.

(b) Break sharp edges of bolt hole as indicated.

(c) Tag yoke to indicate that yoke must be used with oversize bolts (NAS3005E23 or equivalent) and with ballscrew with oversize bolt holes.

(2) Yoke ID corrosion removal

(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 per SOPM 20-10-03 machined area shown. 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 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 20-42-09, type 3. Nickel plate runout 0.01-0.03 inch around edges of ID and all holes.

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

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

(i) Magnetic particle check per 20-20-01 class B.

(j) Low hydrogen embrittlement stylus cad plate per 20-42-10 any unplated areas created due to chrome plate stops. Observe post plate bake requirements in 20-42-03.

(3) Trunnion hole corrosion removal

(a) Machine trunnion hole per 20-10-02 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 20-10-02.

(c) Stress relieve at 350-400°F for 4 hours per 20-10-02.

(d) Magnetic particle check the machined area per 20-20-01, class B.

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

(f) Build up the hole diameter with chrome plate per 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 20-10-02 within 10 hours of plating. Stress relieve bake at 350-400°F for 12 hours per 20-10-02.

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

(i) Magnetic particle check per 20-20-01 class B.

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

2. Refinish (Fig. 1101)

NOTE: Refer to 20-30-02 for stripping of protective finishes and to 20-41-01 for explanation of F and SRF finish codes and to AMS (Aeronautical Materials Specifications) for AMS references.

A. Bolt (7), spacer (8), pin (9), cross (10), coupling (16) -- Fig. 401.

B. Gear (17), support (58), housing (60), support (61) -- Fig. 403.

C. Shaft (13) -- Fig. 404

D. Support (82) -- Fig. 405.

E. Washer (15), Retainer (51) -- Cadmium-titanium plate (F-1.18). Material: 4130 steel (120-150 ksi).

F. Retainer (20) -- Anodize per AMS 2470 all over, plus one coat primer BMS 10-11, type 1 (SRF-12.205) on external surfaces and on smallest ID only. Material: Al alloy.

G. Spacer (25) -- Cadmium-titanium plate (F-1.18) plus one coat primer BMS 10-11, type 1 (SRF-12.205). Material: 4130 steel (RC 25-32).

H. Spacers (28, 38, 84) -- Anodize per AMS 2470. Material: Al alloy.

I. Cover (32) -- Anodize per AMS 2470 plus one coat primer BMS 10-11, Type 1 (SRF-12.205) on exterior surfaces only. Material: Al alloy.

J. Housing (46) -- Anodize per AMS 2470 all over. One coat primer BMS 10-11, Type 1 (SRF-12.205) on all external surfaces only, except no paint on machined surfaces. Material: Al alloy.

K. Retainer (81) (P/N 69-37686-1) -- Anodize per AMS 2470 plus one coat primer BMS 10-11, Type 1 (SRF 12.205) all over. Material: Al alloy.

L. Retainer (81), P/N 69-62735-1, -2 -- Anodize all over per AMS 2470 (F-17.05). Apply BMS 10-11, Type 1 primer (F-20.02) plus BMS 10-11, Type 2 enamel (F-21.02) on indicated areas per Fig. 407. Material: Al alloy.

M. Housing (90) -- Anodize per AMS 2470 all over. One coat primer BMS 10-11, Type 1 (SRF-12.205) on all exterior surfaces only, except no paint on machined surfaces. Material: Al alloy.

N. Spring set (68) -- Fig. 402.

3. Replacement (Fig. 1101)

A. Replace all O-rings and seals at each overhaul.

B. Replace ring (74) at each overhaul.

C. Deleted

D. If inserts (91) require replacement, proceed as follows:

(1) Remove damaged insert.

(2) Clean and check threads in bore of housing.

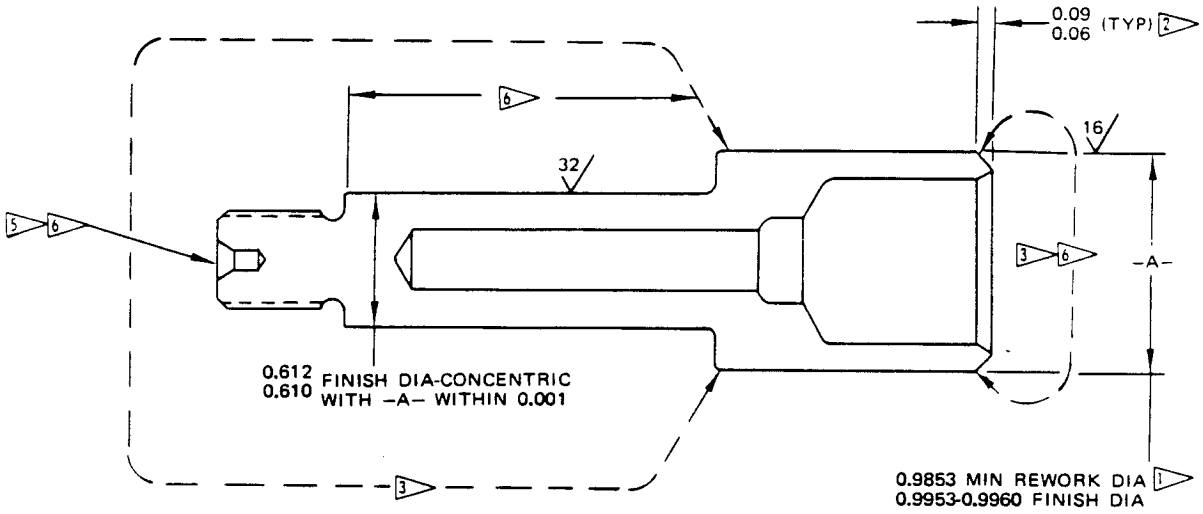
(3) Apply primer, BMS 10-11, Type 1, to bore of housing and to insert. Install insert 1/4 to 1/2 turn below surface of housing while primer is wet. Remove tang.

E. If screws (87) or nameplate (88) require replacement, proceed as follows:

(1) Remove screws (87) and nameplate (88).

(2) Check condition of surrounding surface.

(3) Apply sealant, Loctite, Grade B (SOPM 20-60-04) on screws, position nameplate, and install screws while sealant is wet.



REFINISH 7

CHROME PLATE (F-15.04) DIA -A- CADMIUM-TITANIUM PLATE ALL OTHER SURFACES PER 3 APPLY PRIMER AND PAINT PER 6

REPAIR

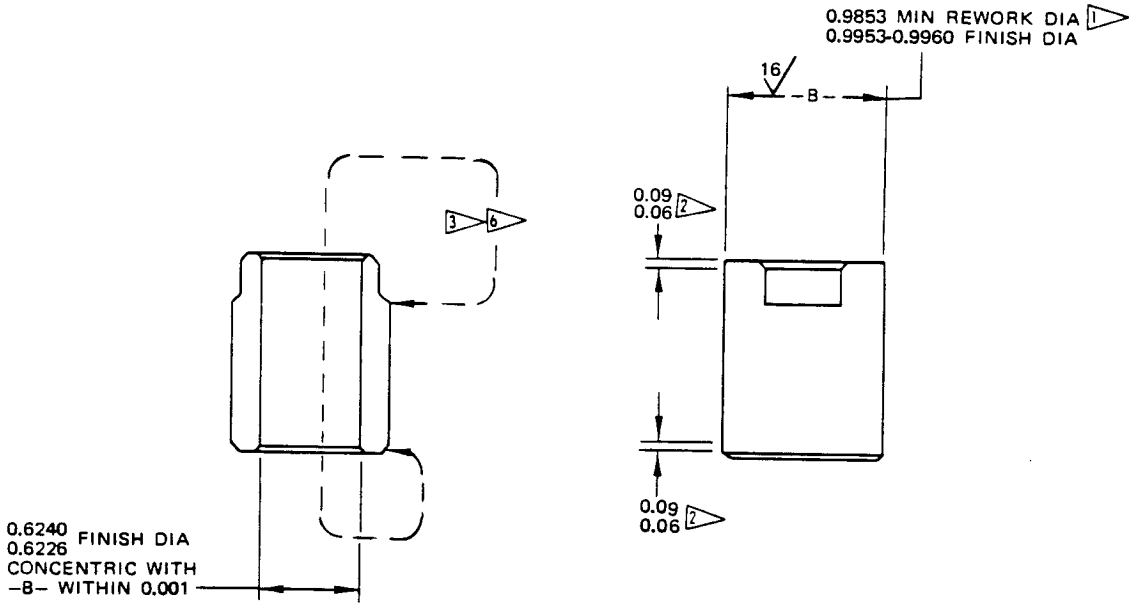
AS NOTED BY 1 2

SHOT PEEN: (REFER TO 20-10-03)
0.017-0.033 SHOT SIZE
0.015 A2 INTENSITY

MATERIAL:

(65-76604-1) 4340M STEEL (275-300 KSI)
(66-23909-1,-2) MOD H-11 STEEL (RC 54-56)

BOLT (7)



REFINISH 7

CHROME PLATE (F-15.04) DIA -B-. CADMIUM TITANIUM PLATE ALL OTHER SURFACES PER 3. APPLY PRIMER AND PAINT PER 6

REPAIR

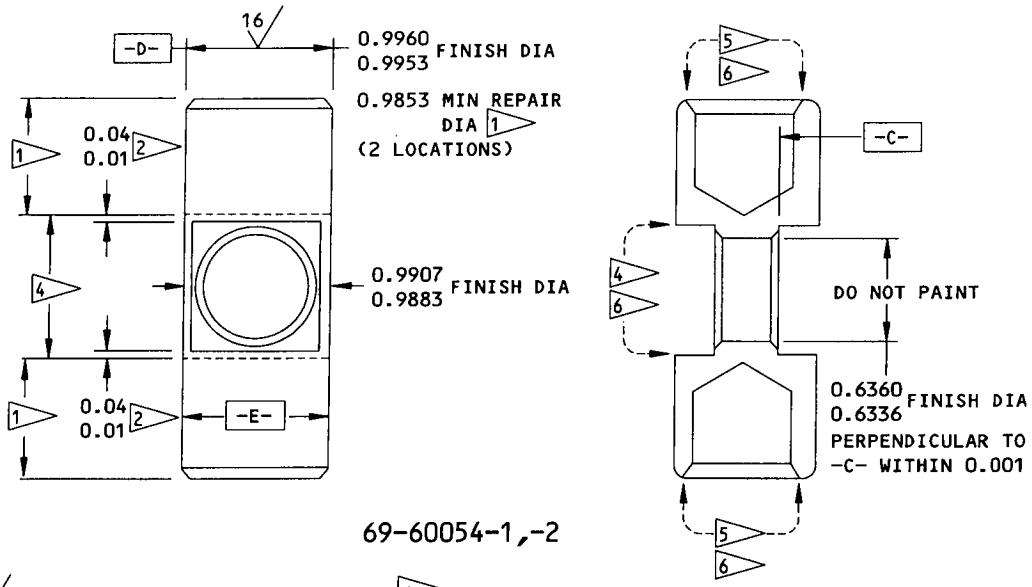
AS NOTED BY 1 2

SHOT PEEN: (REFER TO 20-10-03)
0.017-0.033 SHOT SIZE
0.015 A2 INTENSITY

BREAK SHARP EDGES 0.005-0.015R

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

SPACER (8)



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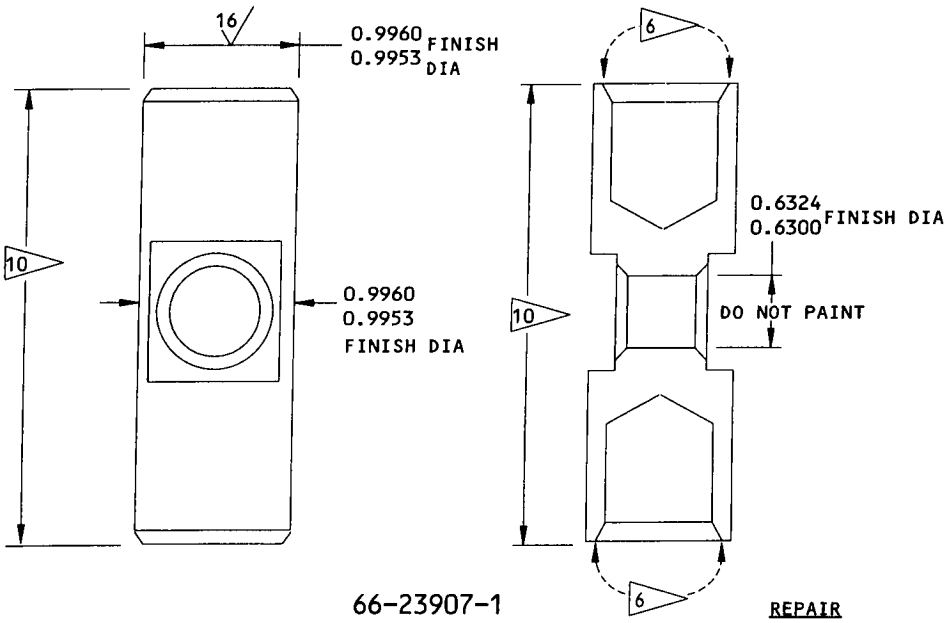

66-23907-1

REFINISH 7

CHROME PLATE (F-15.04) DIAS -D- AND -E-
CADMIUM-TITANIUM PLATE ALL OTHER SURFACES AS SHOWN IN 4.

APPLY PRIMER AND PAINT AS SHOWN IN 6.

REPAIR

AS NOTED BY 1

SHOT PEEN: (REFER TO SOPM 20-10-03)

0.017-0.033 SHOT SIZE
0.015 A2 INTENSITY (69-60054-1,-2)
0.12-0.015 A INTENSITY (66-23907-1)

BREAK SHARP EDGES 0.005-0.015R

MATERIAL: (69-60054-1, 66-23907-1)
MOD H-11 STEEL (RC 54-56)
(69-60054-2) 4340M STEEL
(270-300 KSI)

ALL DIMENSIONS ARE IN INCHES

Bolt, Spacer, Pin and Cross - Repair and Refinish
Figure 401 (Sheet 3)

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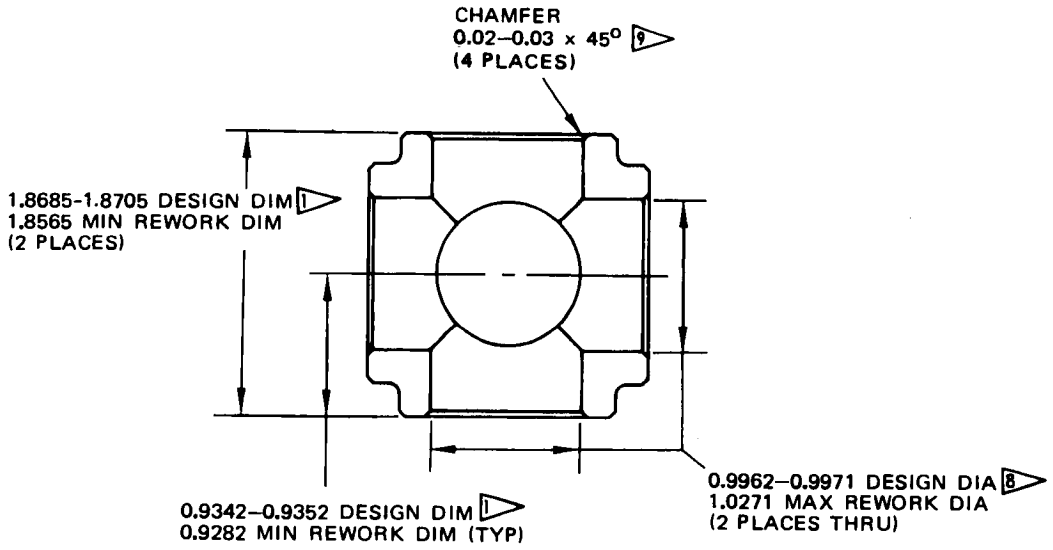


REFINISH

CHROME PLATE (F-15.04) OUTER SURFACES
PER F-1.842 (0.003–0.005 PLATE THICKNESS)

REPAIR

AS NOTED BY

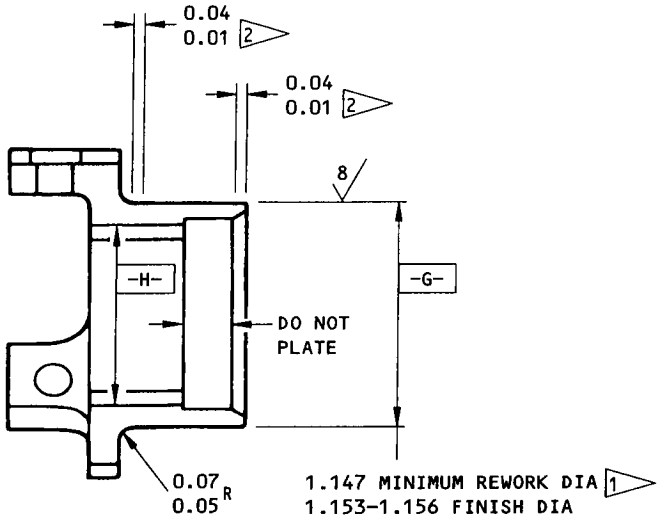
SHOT PEEN: (20-10-03)

0.017–0.033 SHOT SIZE
0.012 A2 INTENSITY

BREAK SHARP EDGES

MATERIAL: (65-76638-1) 15-5PH CRES
(180–200 KSI)
(69-37675-1) MOD H-11 STEEL
(RC 54-56)

CROSS (10)



REFINISH

CADMIUM-TITANIUM PLATE ALL OVER AS SHOWN IN 4 EXCEPT DIA -G- AND AS NOTED

REPAIR

AS NOTED BY 1 2

SHOT PEEN: (SOPM 20-10-03)

0.017-0.033 SHOT SIZE
0.015 A2 INTENSITY

BREAK SHARP EDGES 0.003-0.020R

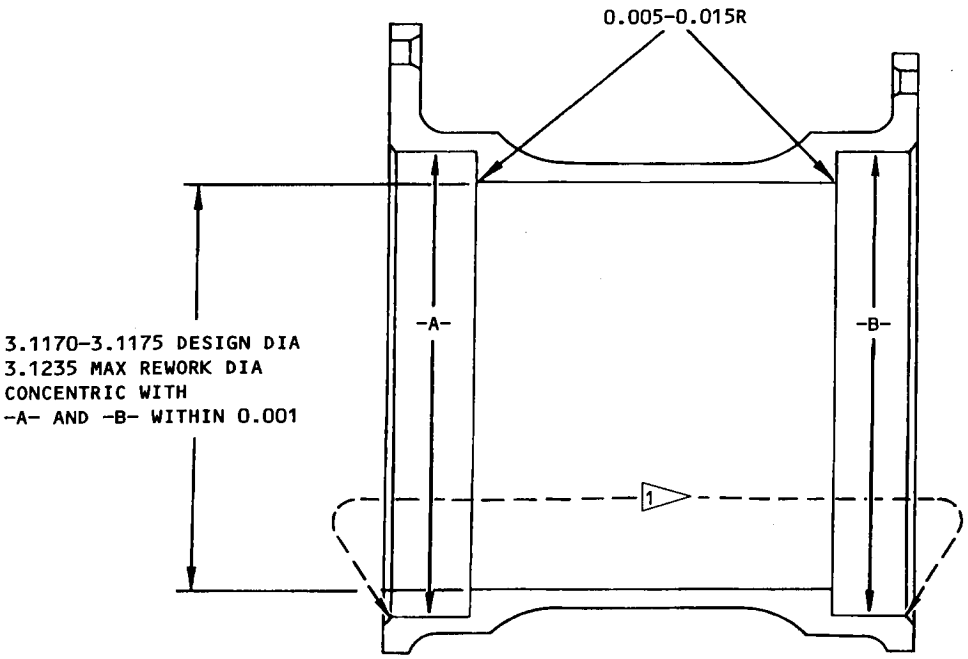
MATERIAL: 8740 STEEL AS GIVEN IN AMS 6322 (RC 32-40)

ALL DIMENSIONS ARE IN INCHES

COUPLING (16)

1. BUILD UP WITH CHROME PLATE (SOPM 20-42-03) AND GRIND TO FINISH AND DIMENSIONS SHOWN. OBSERVE PLATING RUNOUT AS NOTED.
2. CHROME PLATE RUNOUT.
3. CADMIUM-TITANIUM PLATE (F-1.18) 0.0003-0.0005 THICKNESS (SOPM 20-42-02).
4. CADMIUM-TITANIUM PLATE (F-1.181) 0.0005-0.0007 THICKNESS (SOPM 20-42-02).
5. CADMIUM-TITANIUM PLATE THROW IN PREFERRED IN THESE AREAS.
6. AFTER PLATING APPLY PRIMER (SRF-12.205) BMS 10-11, TYPE 1 AND PAINT (SRF-12.63) BMS 10-11, TYPE 2.
7. REPLACES INITIAL ELECTROLESS NICKEL PLATING.
8. BUILD UP WITH NICKEL PLATE (SOPM 20-42-09) (0.004-0.006 THICK) AND CHROME PLATE (SOPM 20-42-03) AND MACHINE TO DESIGN DIMENSIONS SHOWN. TOTAL PLATE THICKNESS AFTER MACHINING TO BE 0.015 MAXIMUM.
9. CHROME PLATE STOPOOFF AREA.
10. ELECTROLESS NICKEL PLATE 0.0023-0.0025 THICK ALL SURFACES.

Bolt, Spacer, Pin and Cross - Repair and Refinish
Figure 401 (Sheet 5)



REWORK

MACHINE ID AS REQUIRED TO INCREASE TORQUE SETTING DESIRED AMOUNT (VALUE INCREASES 6.4 POUND INCHES FOR EACH 0.001 INCREASE OF ID).

MATERIAL: 9310 STEEL PER AMS 6265
RC 32-43 CORE HARDNESS
CARBURIZED, RC 60 MIN
AS NOTED.

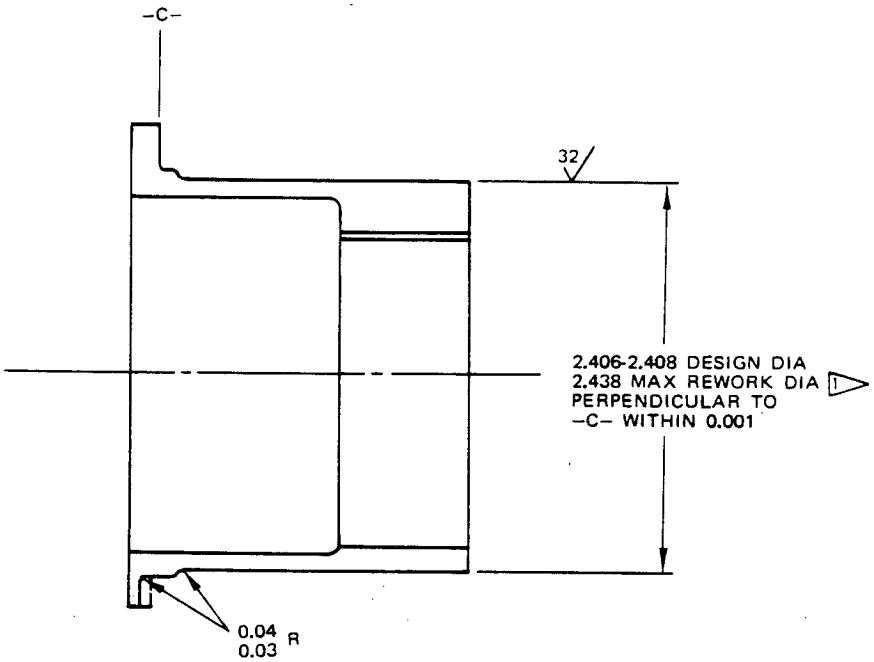
BREAK SHARP EDGES 0.02-0.03R UNLESS OTHERWISE NOTED.

1 CARBURIZED, 0.025-0.035 DEEP

TORQUE BRAKE HOUSING (60)

Torque Brake - Rework
Figure 402 (Sheet 1)

W28148



REPAIR

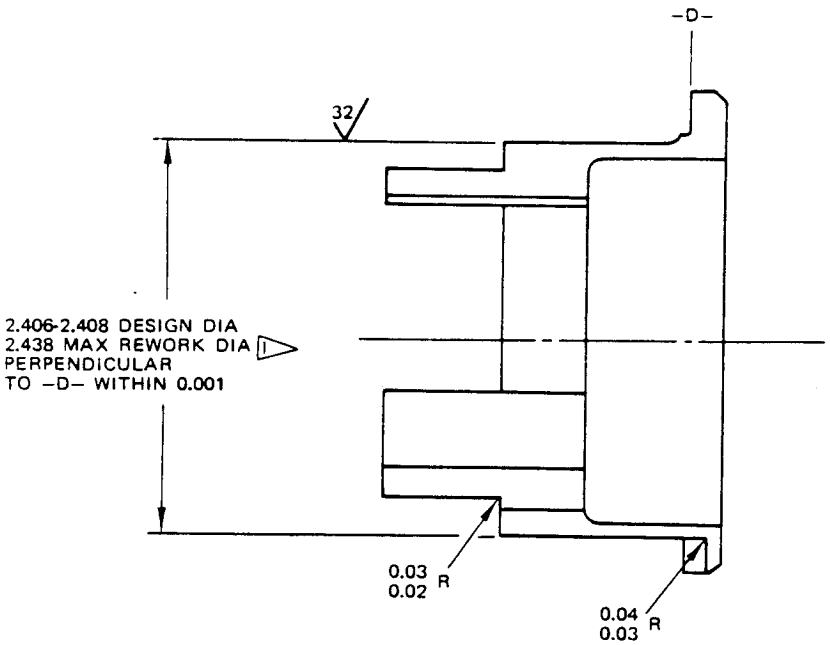
AS NOTED BY 1

MATERIAL: STEEL (HT 290-300 KSI)

BREAK SHARP EDGES 0.005-0.015R

SHOT PEEN: (REFER TO 20-10-03)
0.010-0.019 SHOT SIZE
0.012-0.015 A2 INTENSITY

SLEEVE (66)



REPAIR

AS NOTED BY 1

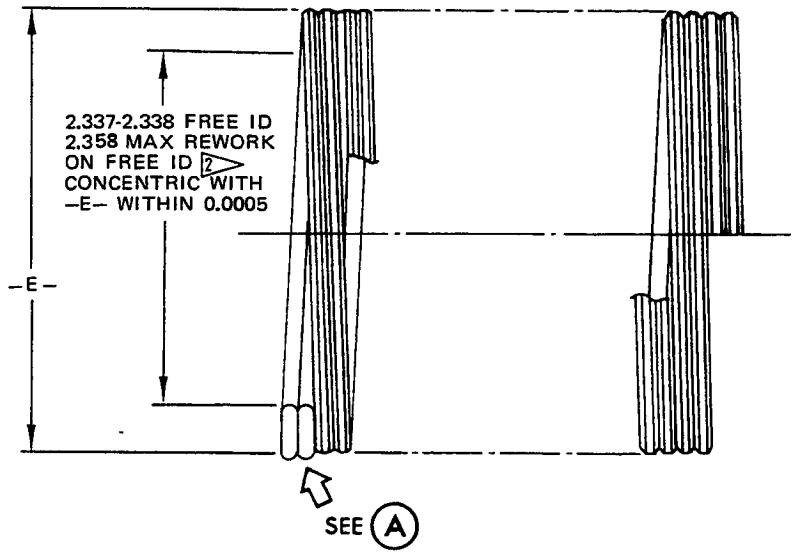
MATERIAL: STEEL (HT 290-300 KSI)

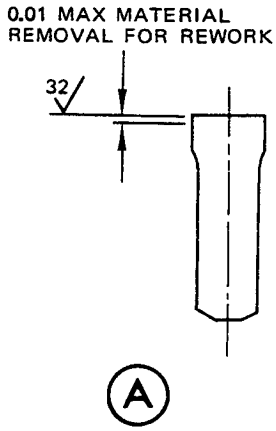
BREAK SHARP EDGES 0.005-0.015R

SHOT PEEN: (REFER TO 20-10-03)

0.010-0.019 SHOT SIZE
0.012-0.015 A2 INTENSITY

SLEEVE (67)





REFINISH

CADMIUM–TITANIUM PLATE ID AND SPRING FLANKS PER 20–42–02

REWORK

1. MACHINE ID AS REQUIRED TO DECREASE TORQUE LEVEL BY DESIRED INCREMENT (VALUE DECREASES 3.0 POUND-INCHES FOR EACH 0.001 INCREASE OF ID).

2. STRESS RELIEVE IN FOLLOWING ORDER:
   A. 320°-330°F FOR 1 HOUR
   B. 625°-675°F FOR 1 HOUR
   C. 920°-930°F FOR 2 HOURS
   D. AIR COOL AT 65°-75°F

   MATERIAL: STEEL (HT 290-300 KSI)

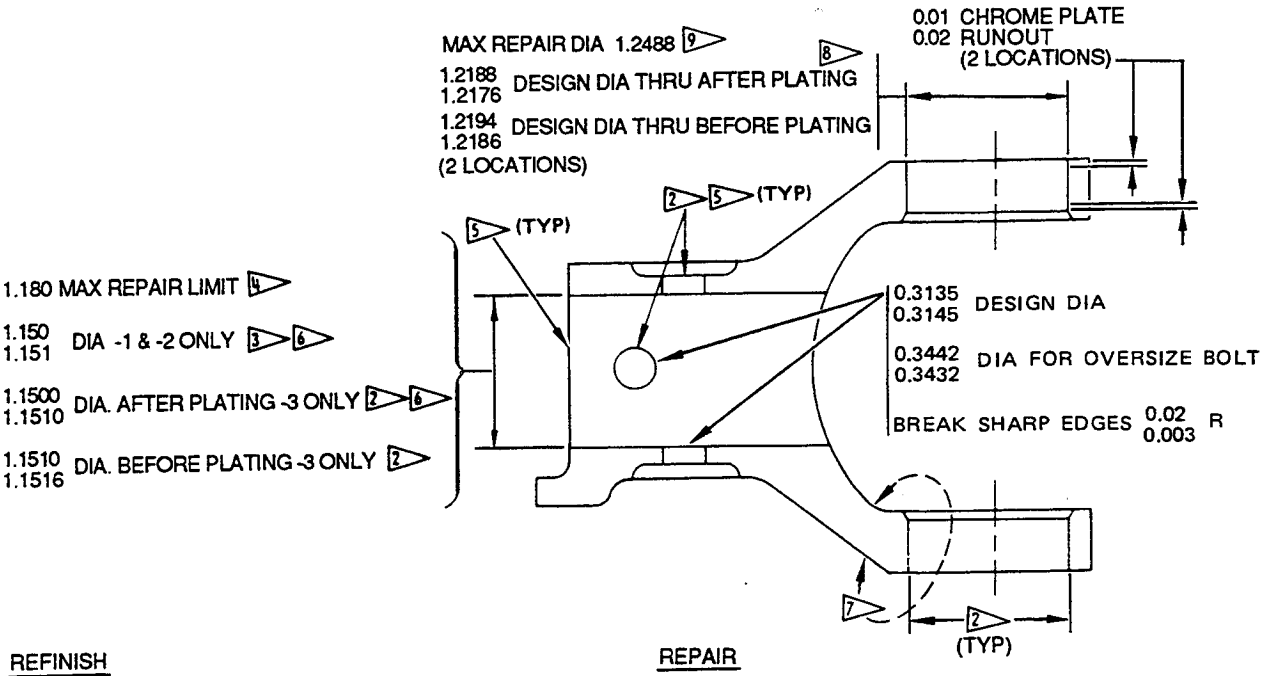
   BREAK SHARP EDGES 0.005-0.015R

SPRING SET (68)

ALL DIMENSIONS ARE IN INCHES

1 MEASURE OD. BUILD UP WITH HARD CHROME PLATE (REFER TO 20-42-03) AS REQUIRED TO OBTAIN FINISH DIA (AFTER MACHINING) EQUAL TO MEASURED OD PLUS AMOUNT THAT ID OF SPRING SET (68) WAS INCREASED (+ 0.0000,-0.0005)

2 NOTE AMOUNT ID IS INCREASED TO DETERMINE REWORK OF SLEEVES (66, 67)



REFINISH

CADMIUM-TITANIUM ALLOY PLATE (F-15.01) ALL OVER 0.0003-0.0005 INCH THICK EXCEPT AS NOTED BY 3. APPLY TWO COATS OF PRIMER, BMS 10-11, TYPE I (F-20.03) EXCEPT AS NOTED BY 2 AND 3.

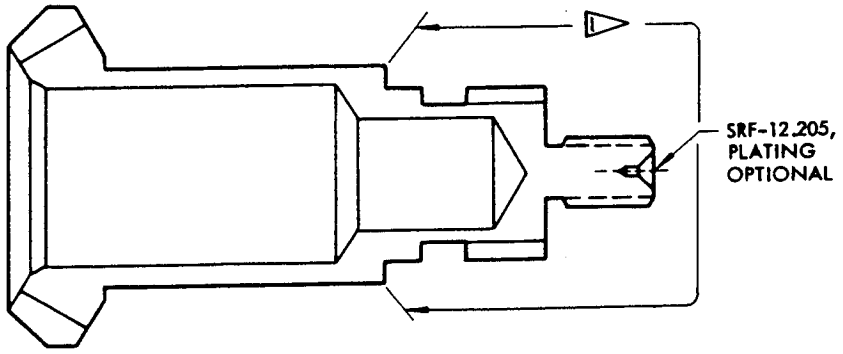
REPAIR

REF 4 5 6 7 8 9

MATERIAL: (69-37642-1, -2) MOD H-11 STEEL (270-300 KSI)
(69-37642-3) 4340M STEEL (270-300 KSI)

SHOT PEEN (REF 20-10-03)

YOKE (12)



REFINISH

CADMIUM–TITANIUM PLATE AS NOTED AFTER PLATING APPLY PRIMER, BMS 10-11, TYPE 1 (SRF-12.205) AS INDICATED

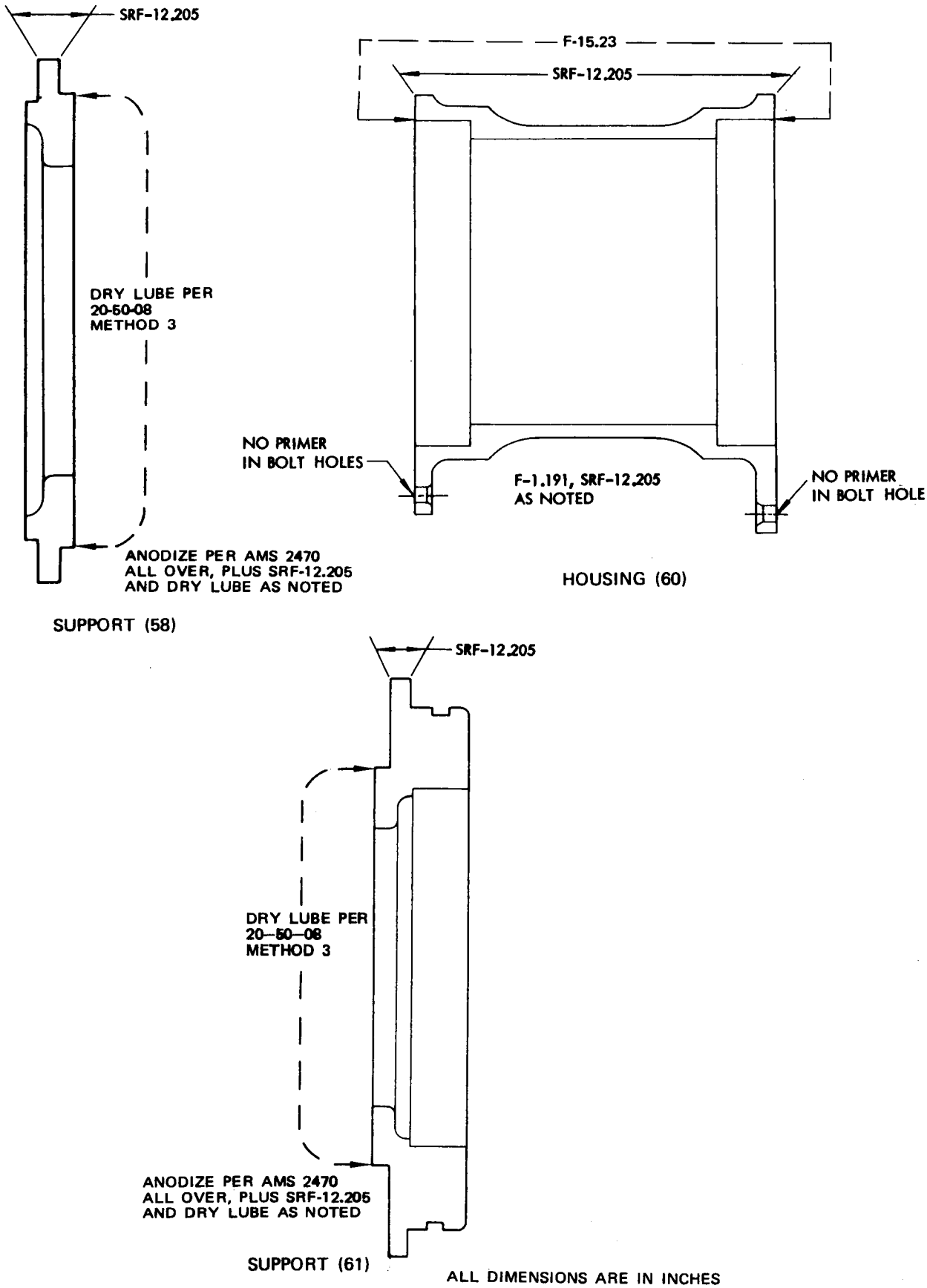
MATERIAL: (69-37605-3, -4) MOD H-11 STEEL (RC 54-56)
(69-37605-5) 4340M STEEL (270–300 KSI)

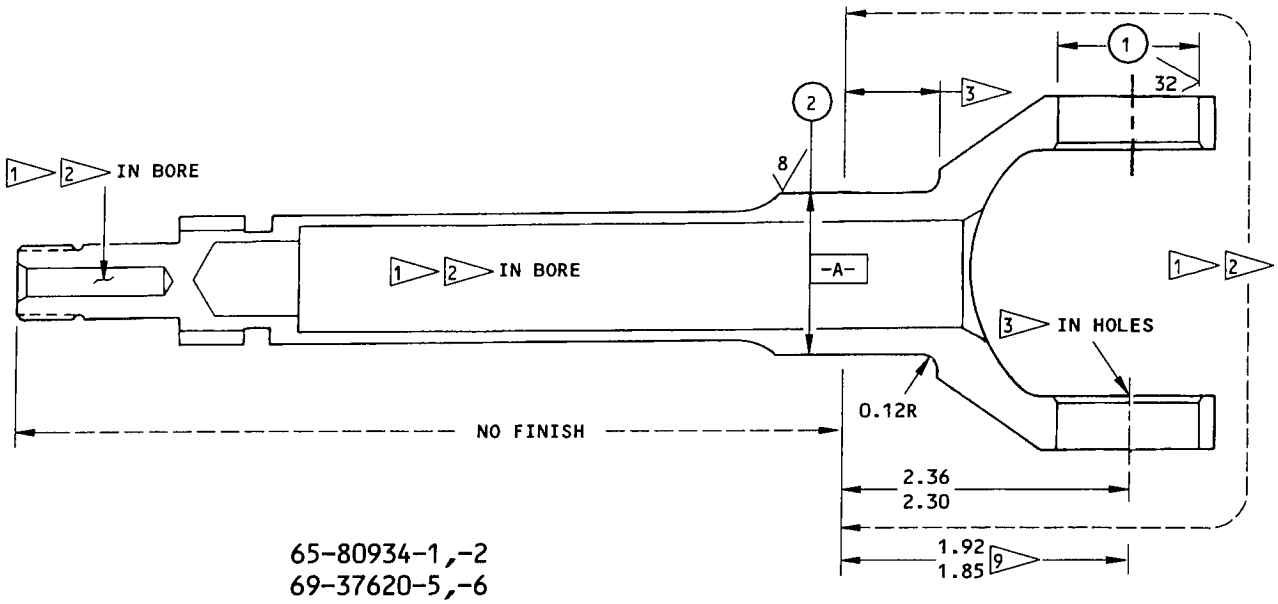
GEAR (17)

1. CADMIUM-TITANIUM PLATE (F-1.18) ALL SURFACES AS NOTED (OPTIONAL IN INTERNAL BORES)
2. NO SHOT PEEN OR PRIMER THIS SURFACE
3. NO CADMIUM-TITANIUM PLATING, SHOT PEEN OR PRIMER THIS SURFACE.
4. BUILD UP CHROME PLATE (REF 20-42-03) (OPTIONAL: ELECTRODEPOSITED NICKEL PLATE (REF 20-42-09)).
5. PLATING RUNOUT 0.01-0.03 INCH AROUND EDGES OF ID AND ALL HOLES
6. OMIT CADMIUM-TITANIUM PLATING IF THIS SURFACE IS REPAIRED
7. SHOT PEEN AREA ALL AROUND HOLE AS SHOWN, 2 LOCATIONS
8. NO CAD-TI PLATING OR PRIMER IF THIS SURFACE IS REPAIRED
9. BUILD UP CHROME PLATE (REF 20-42-03)

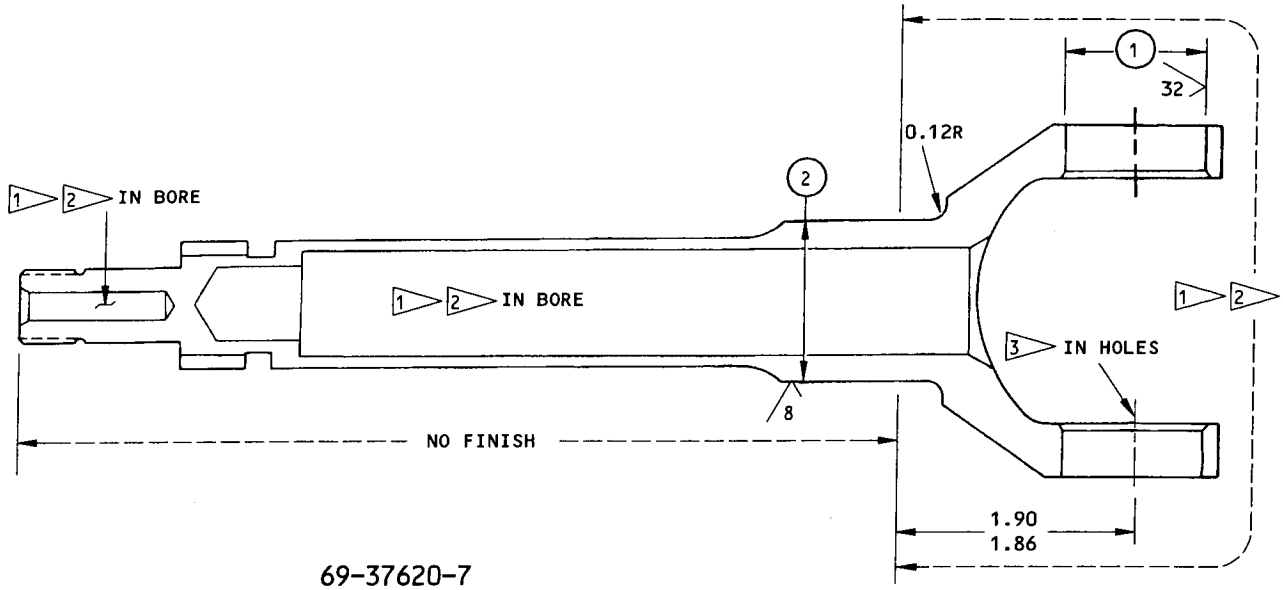
ALL DIMENSIONS ARE IN INCHES

Repair and Refinish
Figure 403 (Sheet 1)


SRF-12.205
DRY LUBE PER
20-50-08
METHOD 3
ANODIZE PER AMS 2470
ALL OVER, PLUS SRF-12.205
AND DRY LUBE AS NOTED
SUPPORT (58)
F-15.23
SRF-12.205
NO PRIMER
IN BOLT HOLES
F-1.191, SRF-12.205
AS NOTED
NO PRIMER
IN BOLT HOLE
HOUSING (60)
SRF-12.205
DRY LUBE PER
20-50-08
METHOD 3
ANODIZE PER AMS 2470
ALL OVER, PLUS SRF-12.205
AND DRY LUBE AS NOTED
SUPPORT (61)
ALL DIMENSIONS ARE IN INCHES



65-80934-1,-2
69-37620-5,-6



69-37620-7
69-62744-1

SHAFT (13)

Repair and Refinish
Figure 404 (Sheet 1)

		(1) 5	(2)
69-37620-5	DESIGN DIAMETER	1.2194 1.2186	1.3762 1.3757 7
	REPAIR LIMIT 4	1.2270	1.3665
69-37620-6	DESIGN DIAMETER	1.2194 1.2186 7	1.3762 1.3757 6
	REPAIR LIMIT 4	1.2264	1.3665
69-37620-7	DESIGN DIAMETER	1.2194 1.2186 7	1.3774 1.3765 6
	REPAIR LIMIT 4	1.2264	1.3665
65-80934-1	DESIGN DIAMETER	1.2194 1.2186 7	1.3760 1.3755 6
	REPAIR LIMIT 4	1.2264	1.3665
65-80934-2	DESIGN DIAMETER	1.2194 1.2186 7	1.3774 1.3765 6
	REPAIR LIMIT	---	---
69-62744-1	DESIGN DIAMETER	1.2194 1.2186	1.3774 1.3765 8
	REPAIR LIMIT 4	1.2270	1.3665

REFINISH

CADMIUM-TITANIUM PLATE SURFACES AS NOTED 1
(OPT IN INTERNAL BORES)

APPLY PRIMER AND ENAMEL AS GIVEN IN 2
EXCEPT AS NOTED 3

REPAIR

REF 4

SHOT PEEN (REF SOPM 20-10-03):
0.017-0.039 SHOT SIZE
0.016 A2 INTENSITY

MATERIAL: (65-80934-1,-2) 4340M STEEL
(275-300 KSI)
(69-37620-5,-6,-7, 69-62744-1)
MOD H-11 STEEL (RC 54-56)

1 CADMIUM-TITANIUM PLATE (F-1.18)
(OPT IN INTERNAL BORES).

2 APPLY PRIMER BMS 10-11, TYPE 1 (SRF-12.205)
AND ENAMEL (SRF-12.63).

3 DO NOT APPLY PRIMER OR ENAMEL.

4 BUILDUP WITH CHROME PLATE
(REF SOPM 20-42-03) AND GRIND TO DESIGN
DIMENSIONS.

5 THRU IN-LINE PERPENDICULAR TO DIA -A-
WITHIN 0.001.

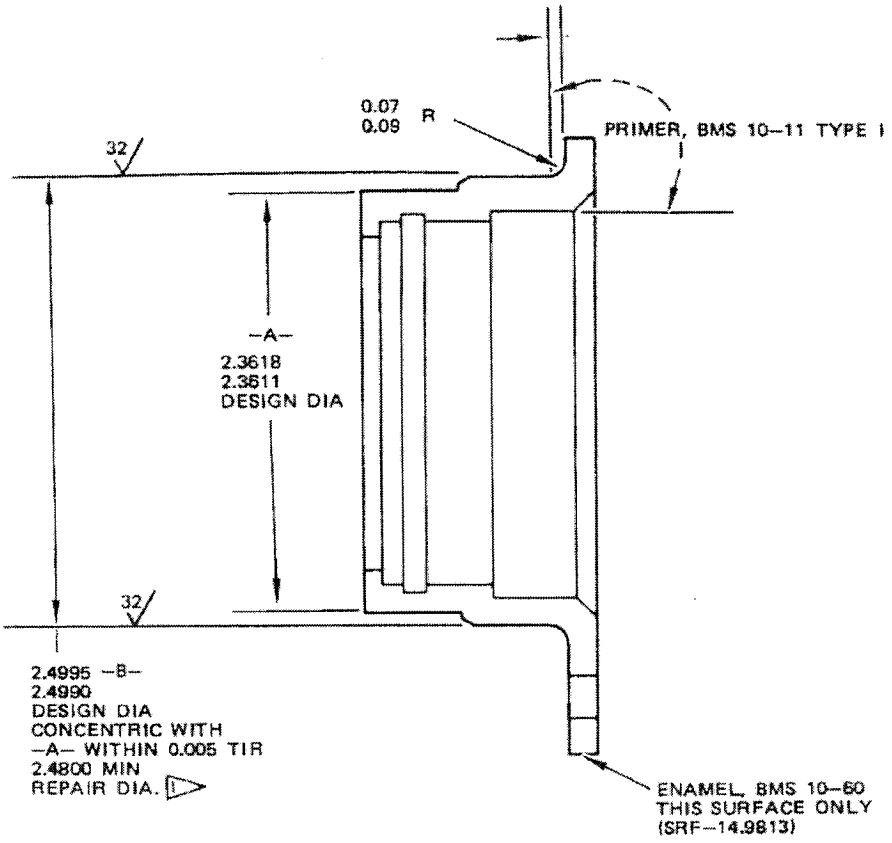
6 DIMENSIONS SHOWN ARE BEFORE PLATING.
PLATE AS SHOWN IN F-1.18, 0.0005-0.0007
THICK.

7 DIMENSIONS SHOWN ARE BEFORE PLATING.
PLATE AS SHOWN IN F-1.18, 0.0003-0.0005
THICK.

8 IF DIMENSIONS CANNOT BE MET, CHROME
PLATE 0.005 TO 0.015 THICK
(REF SOPM 20-42-03).

9 DIMENSIONS SHOWN ARE FOR P/N 65-80934-2
ONLY.

Repair and Refinish
Figure 404 (Sheet 2)



SUPPORT (82)

REFINISH

NO FINISH EXCEPT PRIMER AND ENAMEL AS SHOWN (SRF-12.205) (SRF-14.9813)

REPAIR

AS NOTED 1

SHOT PEEN (REF 20-10-03)
0.017-0.039 SHOT SIZE
0.010 A2 INTENSITY

BREAK SHARP EDGES 0.003-0.020 R

MATERIAL: (69-37668-3, -4)
MOD H-11 STEEL (RC 54-56)
(69-37668-5) 4340M STEEL
(270-300 KSI)

1 BUILDUP WITH CHROME PLATE (REF 20-42-03) AND GRIND TO DESIGN DIM. OBSERVE MINIMUM PLATING RUNOUT AT FILLET RADIUS

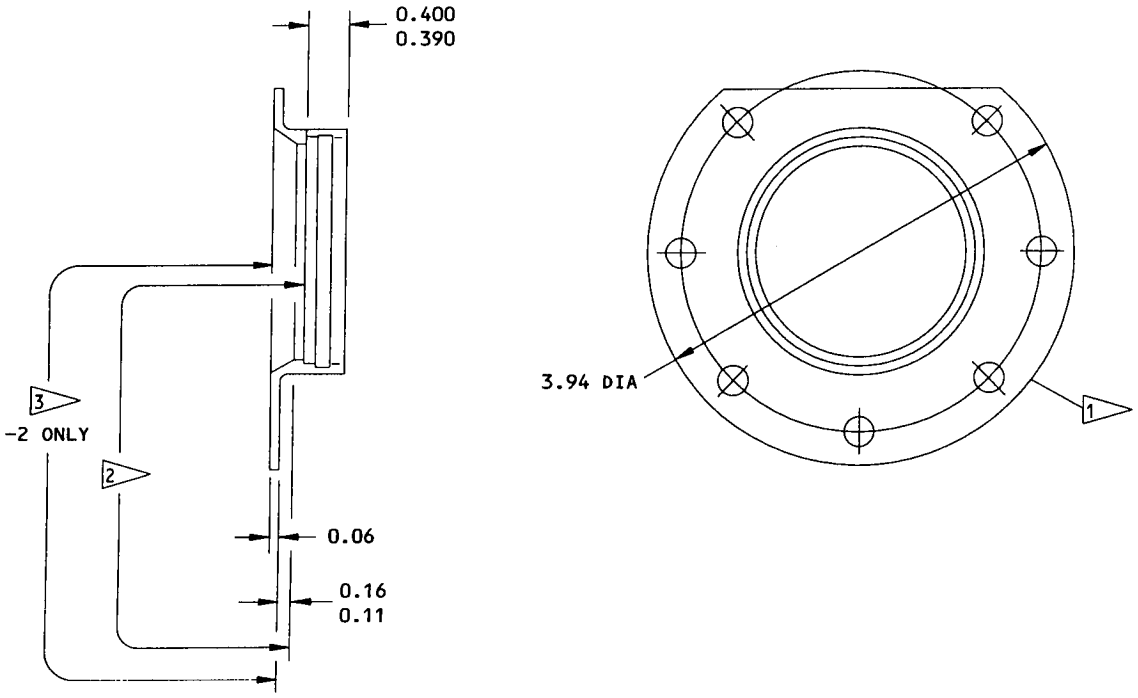
Refinish and Repair
Figure 405

Index No. Fig.1101	Part Number	Part Name	Material	Tensile Strength (ksi)	Stress Relief After Base Material Rework*	
					Temperature (°F)	Time (Hours)
7	66-23909-1, -2	Bolt	S.A.E. H-11**	275 to 300	900 to 950	2
	65-76604-1		S.A.E. 4340 modified		500 to 550	4
8	66-23905-1 69-60050-1	Spacer	S.A.E. H.11**	275 to 300	900 to 950	2
9	66-23907-1 69-60054-1	Pin				
13	69-37620-5 -6	Shaft				
10	69-37675-1	Cross				
	69-37668-3, -4, -5	Support				

* After stress relieving, air cool part at 65°F-75°F and magnetic particle examine per 20-20-01.

** AMS 6487 is the closest equivalent aeronautical material specification.

Stress Relief Data
Figure 406



RETAINER (81)
P/N 69-62735-1,-2

REFINISH

1 ANODIZE (F-17.05) ALL OVER.
2 APPLY BMS 10-11 TYPE 1 PRIMER (F-20.02).
3 APPLY BMS 10-11 TYPE 2 ENAMEL (F-21.02).

REPAIR

125 ALL MACHINED SURFACES

MATERIAL: AL ALLOY

BREAK SHARP EDGES 0.003-0.020R

ALL DIMENSIONS ARE IN INCHES

Repair and Refinish
Figure 407

W76555

ASSEMBLY

1. General

   A. Immerse all O-rings and internally installed parts in hydraulic fluid, Specification MIL-H-5606. These parts are installed while wet.

   B. Apply primer, Specification BMS 10-11, type 1, on faying surfaces, from O-ring groove and outer edge, where required by reassembly procedures. Mate and assemble while primer is wet. Do not allow primer in O-ring groove, on O-ring, or on sealing surface.

   C. Apply primer, Specification BMS 10-11, type 1, to shank and threads of bolts, where required by reassembly procedures. Install while primer is wet.

   D. Lockwire bolts and plugs, where required by reassembly procedures, using double wire twist method.

2. Assembly (See figure 1101.)

   A. Install and adjust gears (17, 36 and 40) as follows:

      (1) See figure 501, diagram numbers 1, 2 and 3, and determine thickness of shims (26, 34 and 37).

      (2) Install bearing (39), spacer (38) and shim (37) on gear (40).

      (3) Position gear (40) in housing (90).

      (4) Install bearing (35) on gear (36) and position gear (36) on gear (40).

      (5) Position shim (34) on cover (32), mate cover to housing (90), and install bolts (30) and washers (31). Tighten bolts (30) to a torque range of 45 to 65 pound-inches.

      (6) Install bearing (29), spacer (28) and bearing (27) on gear (17).

      (7) Position gear (17) in housing (90).

(8) Mate shim (26) to retainer (20) and mate retainer (20) to housing (90). Install bolts (18) and washers (19) and tighten bolts to a torque range of 45 to 65 pound-inches.

(9) Hold gear (40) fixed by wedging between top of gear teeth and housing (90), pushing gear (40) towards gear (36). Measure and record backlash at pitch diameter of spline in gear (17). Refer to figure 601 for backlash limits. If necessary, adjust thickness of shims (26, 34 and 37) to obtain backlash within design limits.

(10) Remove bolts (18 and 30), washers (19 and 31), retainer (20) and cover (32).

(11) Install spacer (25), O-ring (23) and backup rings (24) on gear (17).

(12) Apply sealant BMS 5-95, to fill groove in retainer (20). Install seal (22) in retainer (20) and remove excess sealant.

(13) Install O-ring (21) on retainer (20). Apply primer to faying surfaces and mate retainer (20) to housing (90).

(14) Apply primer to bolts (18) and install bolts and washers (19). Tighten bolts (18) to a torque range of 80 to 100 pound-inches.

(15) Install O-ring (33) on cover (32). Apply primer to faying surfaces and mate cover (32) to housing (90).

(16) Apply primer to bolts (30) and install bolts and washers (31). Tighten bolts (30) to a torque range of 80 to 100 pound-inches.

B. Assemble bearing (83) and seal (85).

(1) For P/N 65-50251-2 through -6 and 65-50258-2 through -6 assemblies, fill groove in support (82) with sealant BMS 5-95. Install seal (85) and spacer (84) and remove excess sealant. Apply light coating of grease, MIL-G-21164 to faying surfaces and install bearing (83) on support (82).

(2) For P/N 65-50251-7 and 65-50258-7 assemblies, install seal (85) on retainer (81). Apply light coating of grease, MIL-G-21164 to faying surfaces and install bearing (83) and O-ring (86A) on support (82).

C. Install O-rings (80 and 86) on housing (90).

D. Apply primer to faying surfaces and mate support (82) and retainer (81) to housing (90). Apply primer to screws and install screws (79), washers (78) and nuts (77). Tighten nuts (77) to a torque range of 50 to 70 pound-inches.

E. Install and adjust gear (75) as follows:

(1) See figure 501, diagram No. 4, and determine thickness of shim (72).

(2) Install bearings (73 and 76) on gear (75).

(3) Install preassembled gear (75), shim (72), support (61), bolts (56), washers (55) and nuts (54) in housing (90). Tighten nuts (54) to a torque range of 180 to 250 pound-inches. Use temporary spacers, approximately same thickness as lugs of housing (60), or use temporary bolts.

(4) Hold gear (75) fixed. Measure and record total backlash between gears (75) and (17). Measure backlash at pitch diameter of spline on gear (17). Refer to figure 601 for backlash limits.

NOTE: If backlash is not within design limits, adjust thickness of shim (72) accordingly.

(5) Install coupling (16) on gear (17).

(6) Install washer (15) and nut (14). Hold coupling (16) with Splined Coupling Wrench F71228-500, or equivalent and tighten nut (14) to a torque range of 160 to 190 pound-inches.

(7) Remove nuts (54), washers (55), bolts (56), support (61) and gear (75) from housing (90).

(8) Insert short splined end of coupling (59) into internally splined end of gear (75). Do not allow coupling (59) to cover ring groove on gear (75).

(9) Install ring (74) into groove of gear (75) and simultaneously push coupling (59) into position so that ring (74) engages groove of coupling (59).

(10) Position preassembled gear (75), coupling (59) and ring (74) in housing (90).

F. Assemble and install torque brake assembly (57) as follows:

(1) Align ends of springs in spring set (68) approximately 180 degrees apart.

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

(2) Deleted.

(3) Place spring set (68) into Spring Pack Assembly Jig, ST6107 (Fig. 502).

NOTE: Install rolled shim between OD of spring set and ID of jig if necessary, to maintain concentricity of spring set when springs are expanded.

(4) Check that top ends of coil are in line with the two locking lugs on jig before applying torque to springs. Insert Torque Bar, PT49001, into coil ends (Fig. 502) and wind spring ends until they are past the locking lugs on top of jig.

(5) Maintain pressure on torque bar. Insert an allen wrench into lockscrew holding locking lug. Rotate lugs inward, in position to prevent springs from unwinding. Lock set screws to prevent lugs from retracting (Fig. 502).

(6) Remove circular portion of assembly jig from its base. Invert unit and reinstall firmly on base. Use torque bar to align locking lugs into spring ends on bottom of spring set. Lock lugs in place by tightening set screws.

(7) Wind springs about thirty degrees further by rotating takeup screws in spring pack jig. This will expand spring set so that sleeves (66 and 67) can be inserted.

(8) Coat all surfaces of sleeve (66) with a light film of hydraulic fluid, MIL-H-5606, and assemble into expanded spring pack.

(9) Remove circular portion of assembly jig from its base. Reinstall this section onto base so that sleeve (66) is on bottom. Slip a wood block between sleeve (66) and base to prevent sleeve from dropping out.

(10) Coat sleeve (67) with hydraulic fluid, MIL-H-5606 and insert into spring pack. Make sure sleeve is fully inserted and internal lugs align with sleeve (66). Loosen locking lugs on assembly jig and press sleeve (67) further into spring set. Slide locking lugs inward and secure flats on sleeve (67).

(11) Remove circular portion of assembly jig from base. Apply a light film of hydraulic fluid, MIL-H-5606 to adapter (58A).

(12) Insert adapter (58A) into spring pack with internal splines pointing outward. Ears of adapter (58A) must mate with lands of sleeve (66) (Fig. 503).

(13) Slowly unwind spring set by rotating assembly jig to relieve spring expansion. Spring friction will prevent sleeves and adapter from dropping out.

(14) Back off locking lugs on top side of assembly jig. Use thumbs to remove spring pack by applying pressure on flange of sleeve (67). Use care to prevent misalignment of internal components.

NOTE: A light plastic drift may be used to force pack from jig. Do not permit spring pack to drop.

(15) Place assembled parts in arbor press. Protect flanged faces of sleeves (66, 67) and apply an end load of 75-100 pounds to stack springs tight.

(16) Install rings (64, 69) over spring set and press down to remove clearance and end play.

(17) Measure stacked height of assembled parts. Select shims (65) to provide dimension of 3.622-3.634 inches after installation. Remove end rings (64, 69) and install shims as shown in Fig. 504. Shims used on same end of assembly are to be identical at two places 180 degrees opposite. Use the least quantity of shims required by selecting the larger sizes of shims. The dimension may be met without requiring shims, or with shims at one end only. When more than one shim is required, use same thickness at each end within 0.01 inch. Two shims may be stacked together to increase range. Maximum permissable shimming is 0.09 inch at each end (one 0.04-inch shim and one 0.05-inch shim). Trim ends of stacked shims as required so they do not protrude beyond spring O.D.

(18) Install one end ring (64) over spring on sleeve (66) end. Slide other end of pack into housing (60), and press the remaining end ring (69) over spring set (68) and into housing.

(19) Install shim (72) and O-rings (70, 71) in support (61).

(20) Apply primer to faying surfaces and mate support (61) to housing (90) and housing (60) to support (61).

(21) Apply primer to bolts and install bolts (56), washers (55), and nuts (54). Tighten nuts (54) to 180-250 lb-in.

G. Assemble and install shaft (13) and housing (46) as follows:

(1) Insert shaft (13) through housing (90) and torque brake assembly (57).

(2) Install O-ring (47) on support (58) or housing (46), and O-ring (70) on support (58).

CAUTION: DO NOT RE-USE OLD WASHER (49) OR FAILURE OF TANGS AND LOSS OF NUT RETENTION MAY OCCUR.

(3) Install bearing (52) on adapter (53) and install adapter (53), retainer (51), new washer (49) and nut (50) on shaft (13). Tighten nut (50) to 200-240 lb-in., using Wrench Adapter ST6105-1. Bend tangs of washer (49) to secure nut (50).

(4) See Fig. 501, diagram No. 5, and determine thickness of shim (48).

(5) Install shim (48) in housing (46). Shim (48, 66-24730-2) must have solid face next to bearing (52). Apply primer to faying surfaces, and mate support (58) to housing (60) and housing (46) to support (58).

(6) Apply primer to bolts and install bolts (42, 45), washers (44) and nuts (41, 43). Tighten nuts (43) to 180-250 lb-in. and bolts (42) to 225-275 lb-in.

H. Assemble universal joint assembly (3) as follows:

(1) Position cross (10) in yoke (12) and install pin (9) through yoke (12) and cross (10).

(2) Coat shank of bolt (7) and threads of nut (5) with MIL-C-11796, corrosion preventive compound. Position shaft (13) on cross (10) and install bolt (7), spacer (8) and nut (5). Tighten nut (5) as follows:

(a) Tighten nut to 170-200 lb-in. if used with bolt 66-23909-1, -2.

(b) Deleted.

(c) The requirements for nut (5) installation, when it is used with bolt P/N 65-76604-1, are as follows:

1) The self-locking mechanism of the nut must develop a torque between 25 and 100 pound-inches at room temperature with no axial load on the nut and the thread fully engaged. The full chamfer of the bolt thread must protrude beyond the locking mechanism of the nut.

2) Tighten nut to 170-200 pound-inches.

J. Install O-rings (2) and plugs (1) on drain and filler ports. Lockwire plug (1) on drain port to housing (90).

K. Service transmission assembly as follows:

(1) Position assembly with yoke end of shaft (13) 3 degrees below horizontal plane. Remove plug (1) on upper (filler) port.

(2) Fill assembly, through filler port, with hydraulic fluid, Specification MIL-H-5606, until fluid is at filler port level.

(3) Install plug (1) and lockwire to a pair of bolts (30) on cover (32). Lockwire other pair of bolts (30) together. Lockwire bolts (18) in pairs.

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

(5) Repair or touch up any damaged or omitted finished surface.

3. Materials

A. Hydraulic Fluid -- Specification MIL-H-5606

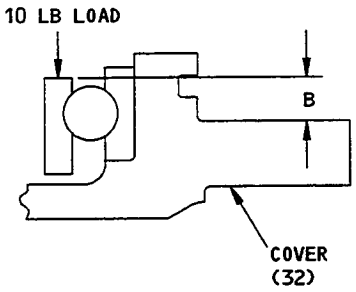
B. Primer -- Specification BMS 10-11, Type 1

C. Grease -- Specification MIL-G-21164

D. Sealant -- BMS 5-95 (Ref 20-60-04), replaces Permatex No. 2

E. Paint -- Glyptal (General Electric Co., Insulating Materials Department, Downey, California)

F. Corrosion Preventive Compound -- Specification MIL-C-11796, Class 3



DETAIL OF BEARING (35)

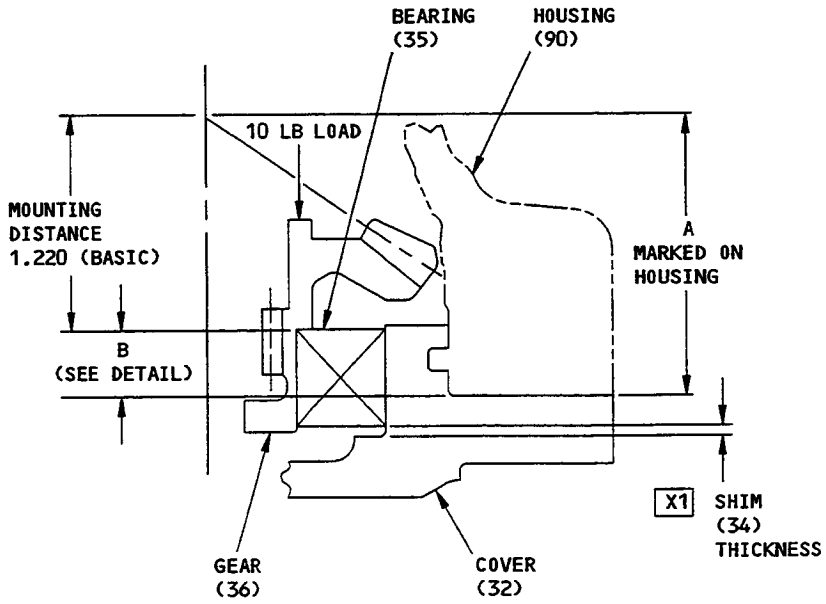


DIAGRAM NUMBER 1

SHIMMING CALCULATION

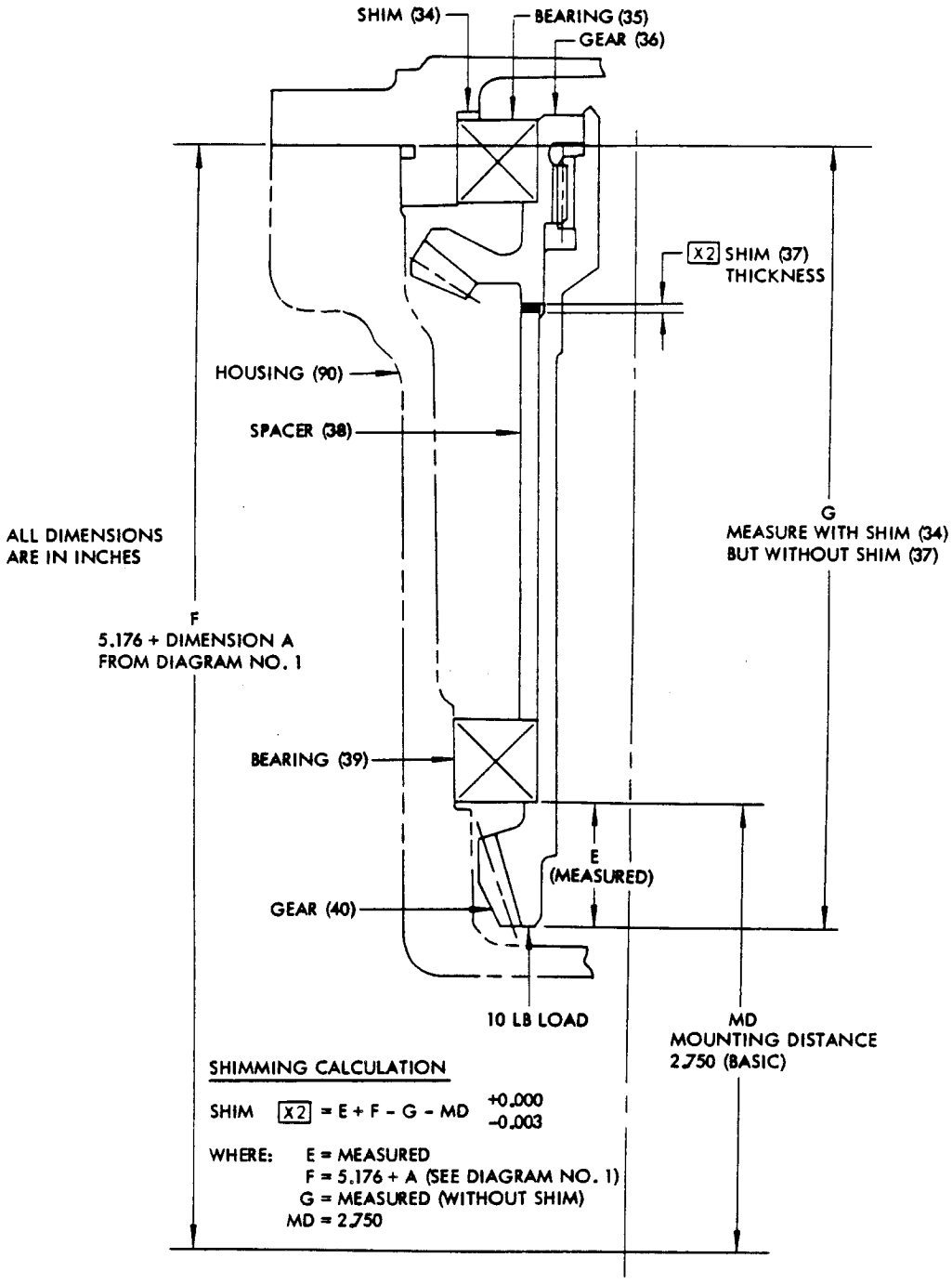
SHIM [X1] = A - B - MD $^{+0.000}_{-0.003}$

WHERE: A = VALUE ON HOUSING
B = MEASURED
MD = 1.220

ALL DIMENSIONS ARE IN INCHES

Shimming Diagrams
Figure 501 (Sheet 1)

F85051



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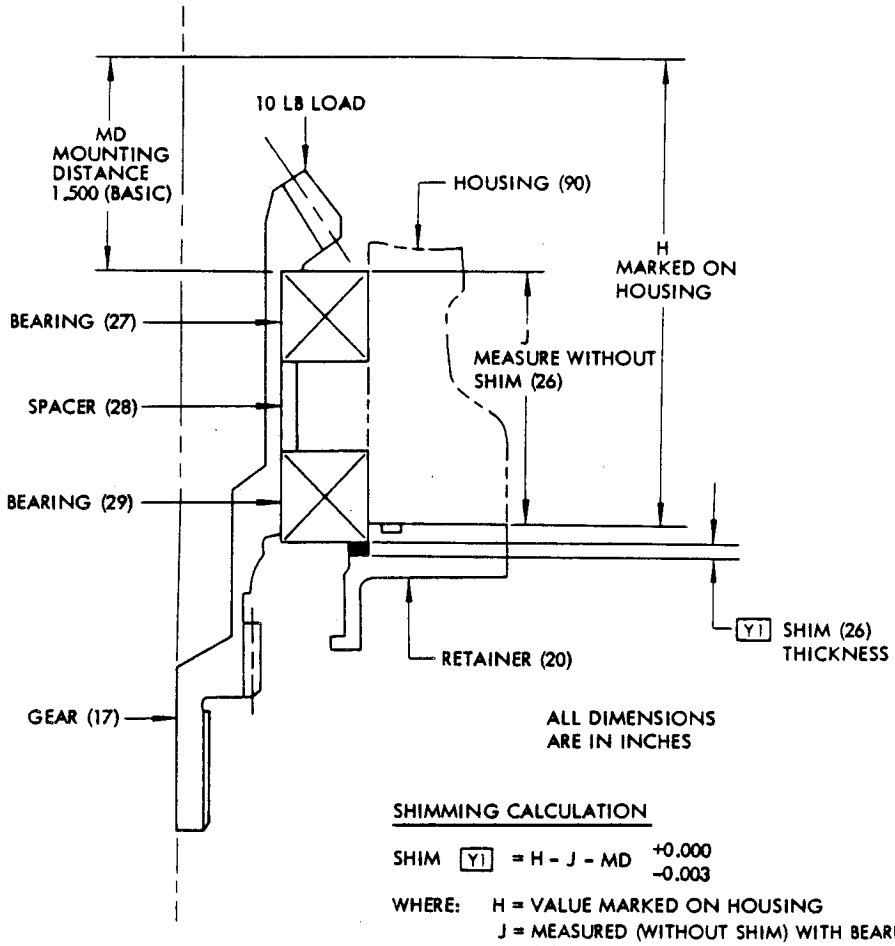
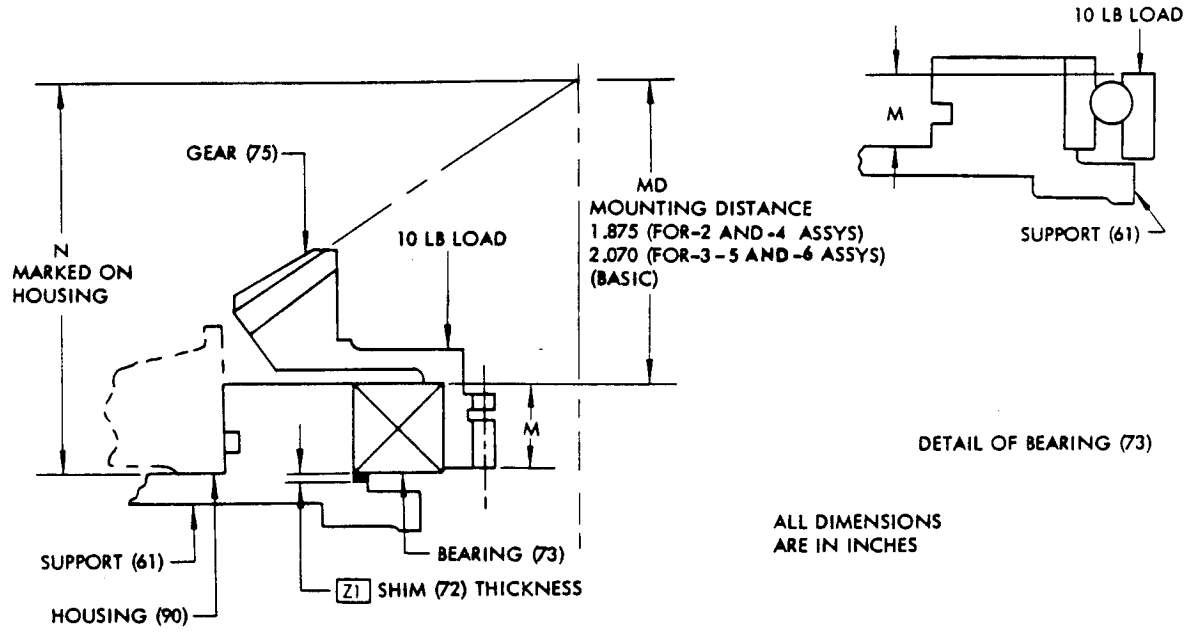


DIAGRAM NUMBER 3

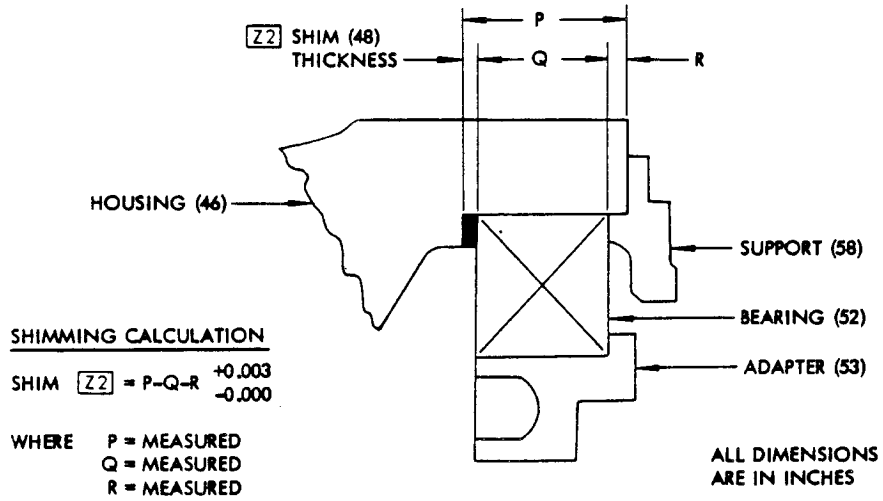


SHIMMING CALCULATION

SHIM Z1 = N - M - MD $^{+0.000}_{-0.003}$

WHERE N = MARKED ON HOUSING
M = MEASURED (WITHOUT SHIM)
MD = MOUNTING DISTANCE

DIAGRAM NUMBER 4

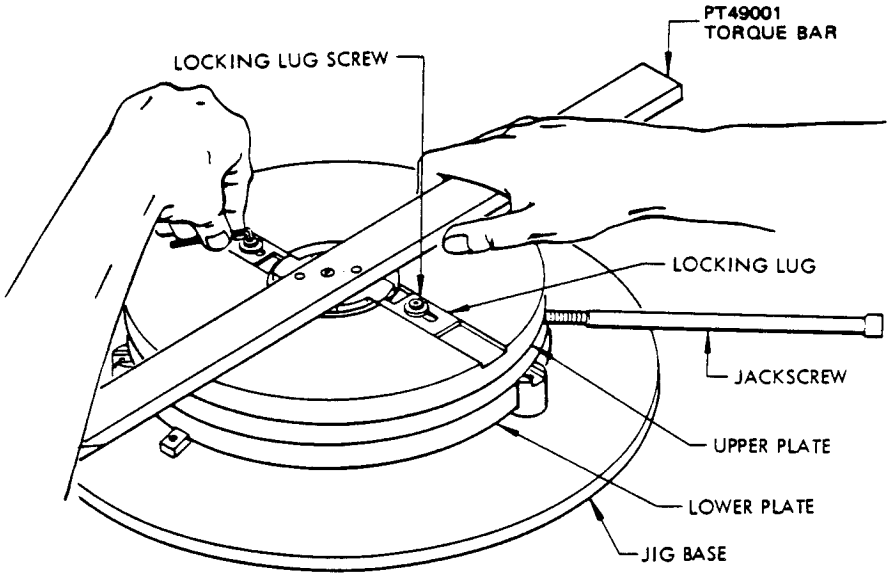


SHIMMING CALCULATION

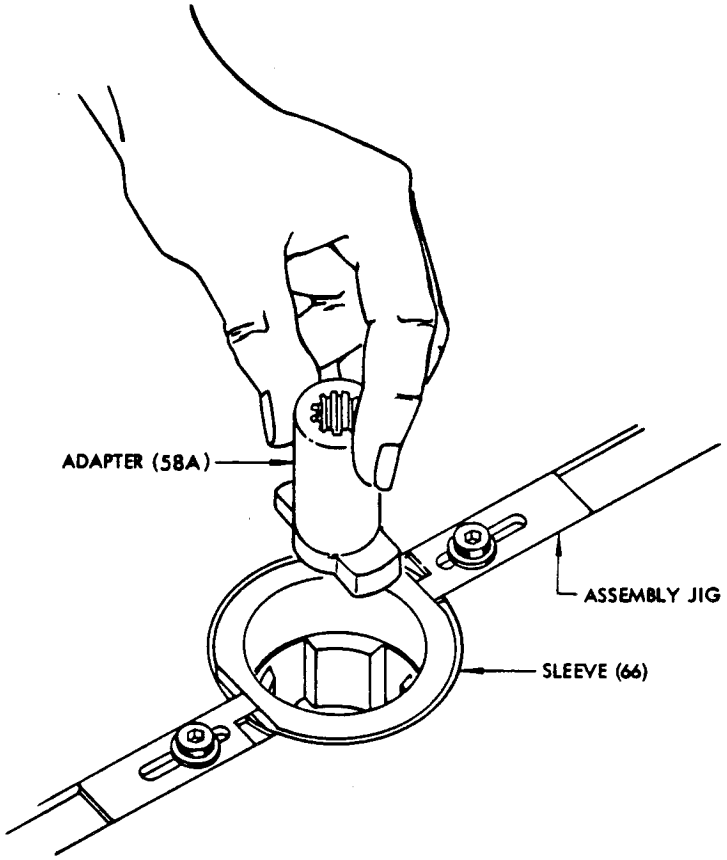
SHIM Z2 = P-Q-R $^{+0.003}_{-0.000}$

WHERE P = MEASURED
Q = MEASURED
R = MEASURED

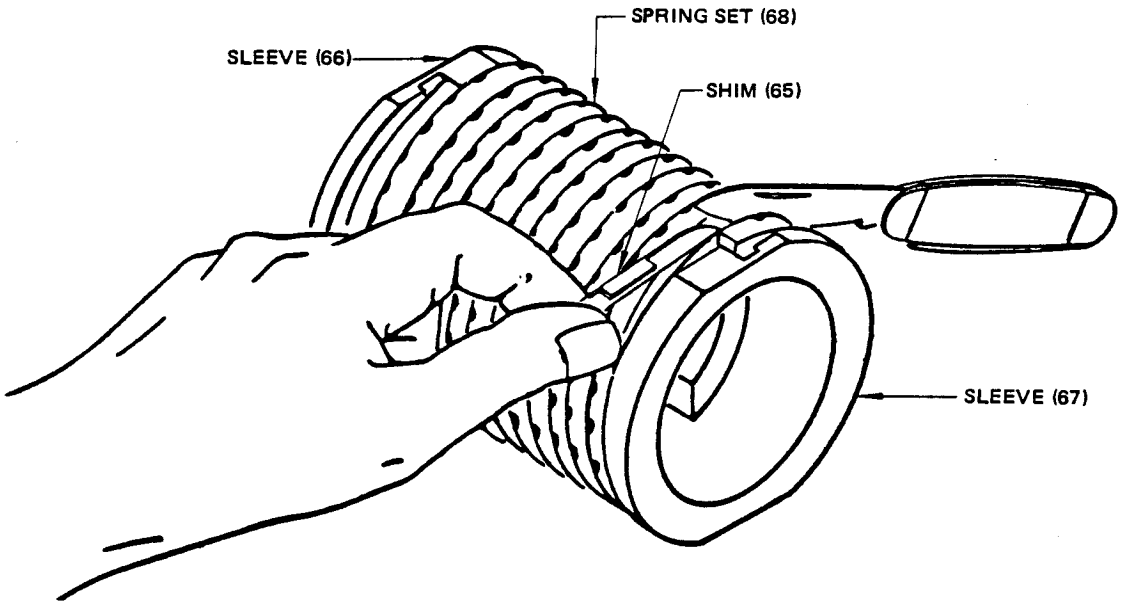
DIAGRAM NUMBER 5



Spring Pack Assembly Jig, ST6107
Figure 502



Spring Pack Building
Figure 503

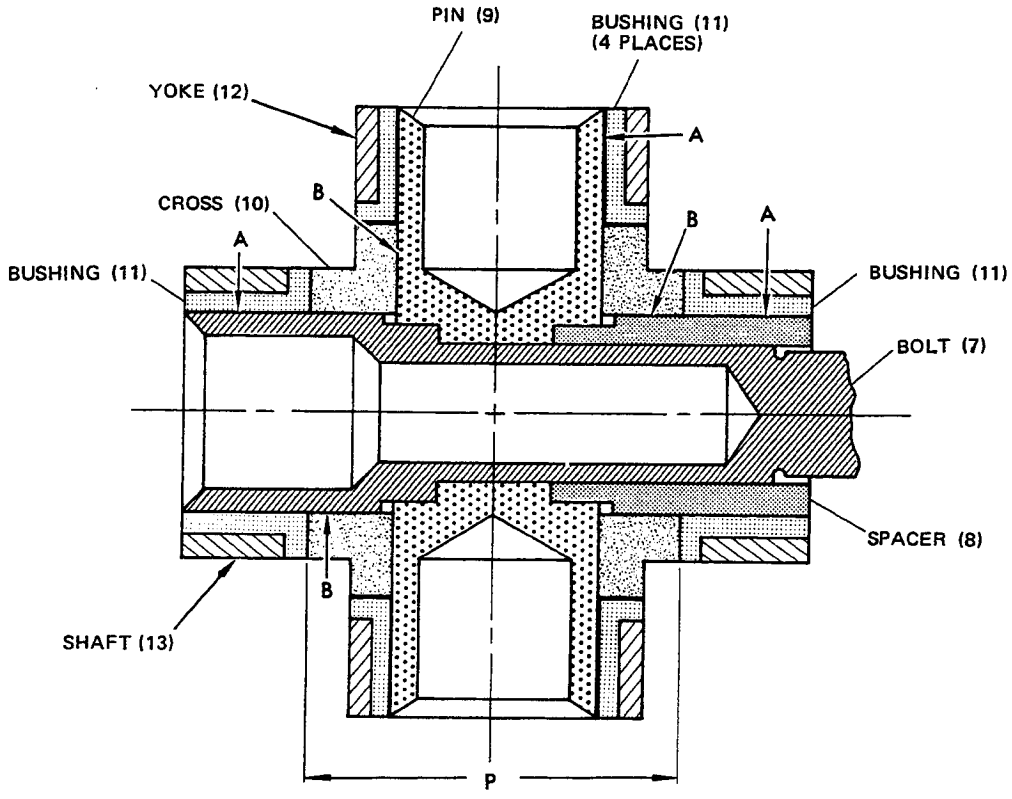


Spring Pack Shim Installation
Figure 504

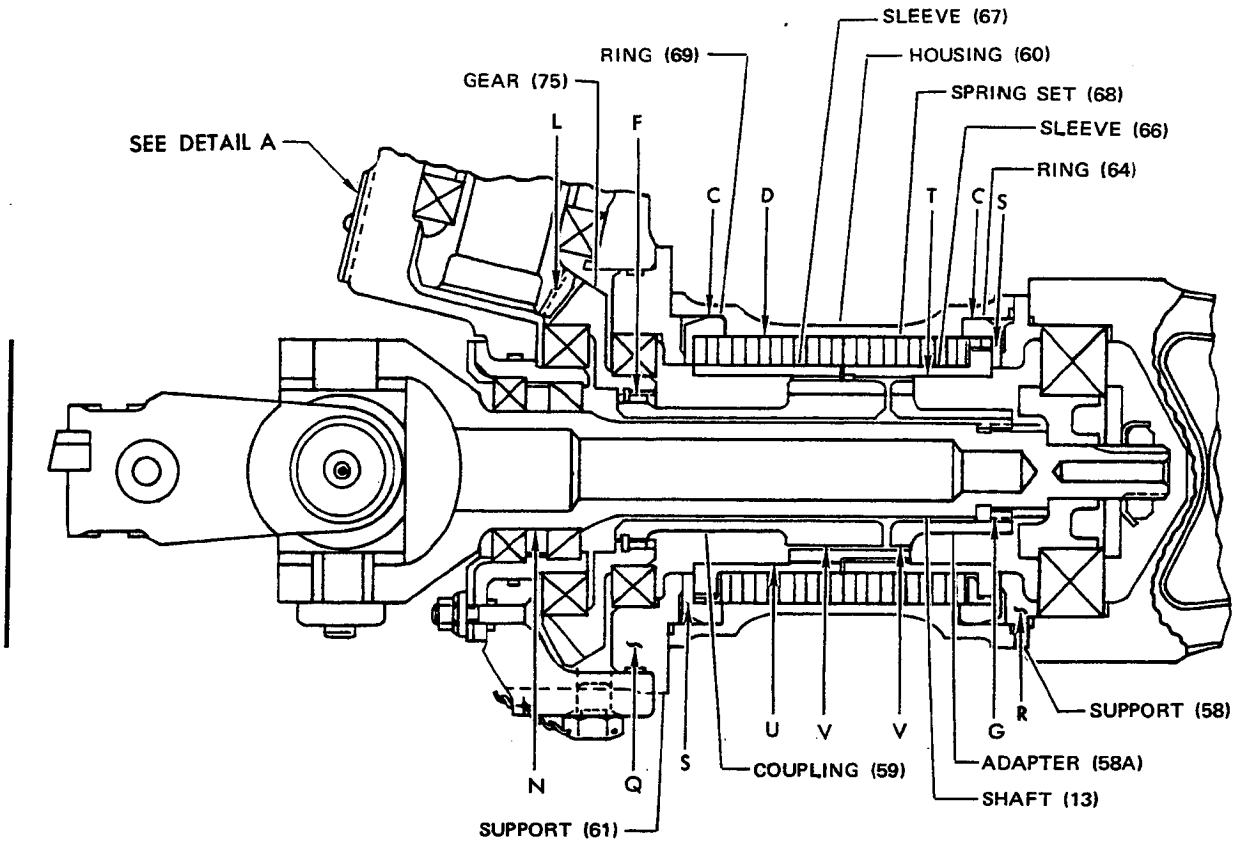
FITS AND CLEARANCES

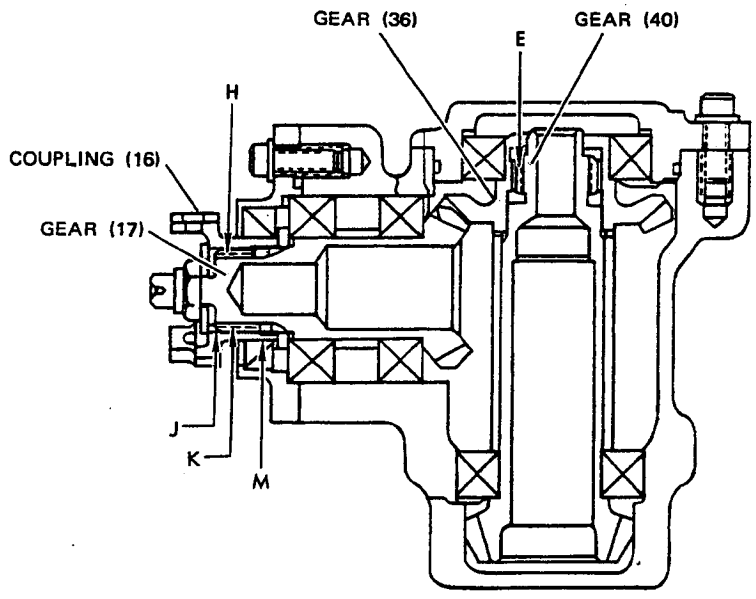
1. The fits and clearances table lists design dimensions and service wear limits for close tolerance parts of the assembly that are subject to wear or corrosion. Unless otherwise specified, parts should be returned to the design dimensions whenever rework is accomplished.

2. Clearances are given to aid assembly of the components. The values given in the Maximum Allowable Clearance column are the maximum permitted to ensure proper functioning of the unit. If assembled parts fail to meet this requirement, one or more of the parts must be rejected. Parts that are rejected should be reworked if within the rework limits given in the Repair procedure; if not within rework limits, the parts should be scrapped. It is recommended that the design clearances be used as the guiding assembly criteria when newly reworked parts are assembled.



Fits and Clearances
Figure 601 (Sheet 1)





DETAIL A

FLAP DRIVE TRANSMISSION ASSEMBLIES

Fits and Clearances
Figure 601 (Sheet 2)

Ref Letter Fig. 601	Mating Item No. Fig. 1101	Design Dimensions				Service Wear Limits		
		Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inch)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
A	ID 11 OD 7,8,9	0.9990 0.9953	1.0000 0.9960	0.0010	0.0044	0.9943	1.0060	0.0120
B	ID 10 OD 7,8,9	0.9962 0.9953	0.9971 0.9960	0.0002	0.0022	0.9940	0.9990	0.0050
C	ID 60 OD 64,69	3.524 3.519	3.525 3.520	0.004	0.006	3.518	3.526	0.008
D	ID 60 OD 68	3.1170 3.0180	3.1175 3.0190	0.0980	0.0995	3.0175	3.1180	0.0985
E	36 40			0.0000	0.0167			0.0278
F	59 75			0.0015	0.0073			0.0090
G	58A 13			0.0015	0.0069			0.0090
H	16 17			0.0000	0.0054			0.0090
J	17 36,40 75			0.0020	0.0160			0.0252
K	17 36 40			0.0008	0.0113			0.0182

Fits and Clearances
Figure 601 (Sheet 3)

Ref Letter Fig. 601	Mating Item No. Fig. 1101		Original Design Dimensions: Dimensions (inches) Min	Original Design Dimensions: Dimensions (inches) Max	Original Design Dimensions: Assembly Clearance (inch) Min	Original Design Dimensions: Assembly Clearance (inch) Max	Service Wear Limits: Dimension Limits (inch) Min	Service Wear Limits: Dimension Limits (inch) Max	Service Wear Limits: Maximum Allowable Clearance (inch)
L	▷7	40 75			0.0012	0.0048			0.0070
M	OD	16	1.153	1.159			1.153		
N	OD	13 ▷16	1.3765	1.3774			1.3720		
N	OD	13 ▷17	1.3763	1.3772			1.3720		
N	OD	13 ▷18	1.3767	1.3776			1.3720		
N	OD	13 ▷19	1.3775	1.3788			1.3720		
P	▷8	10 ▷11	1.8661	1.8705			1.8630		
P	▷8	10 ▷12	1.8685	1.8705			1.8650		
Q	▷8	61	0.158	0.160			0.150		
R	▷8	58	0.153	0.155			0.140		
S	▷8	64,69	0.089	0.091			0.087		
T	▷9	66	0.598	0.602			0.590		
U	▷9	67	0.883	0.887			0.875		
V	▷10	59,58A	0.645	0.649			0.637		

▷1 Spline backlash, measured at 2.7000-inch pitch diameter of gear (36) while gear (40) is fixed.

▷2 Spline backlash, measured at 1.6875-inch pitch diameter of spline in gear (75) while coupling (59) is fixed.

▷3 Spline backlash, measured at 1.0000 -inch pitch diameter of spline in shaft (13) while adapter (58A) is fixed.

▷4 Spline backlash, measured at 1.6875-inch pitch diameter of spline in coupling (16) while gear (17) is fixed.

Fits and Clearances
Figure 601 (Sheet 4)

K55189

5> Total backlash (of gears 17, 36, 40, 75). Prior to disassembly, hold gear (75) by wedging through drain hole and measure backlash at 0.8750-inch pitch diameter of spline in gear (17).

6> Compound backlash (of gears 17, 36, 40). Prior to disassembly from housing (90) fix gear (40) and measure backlash at pitch diameter of spline in gear (17) (see above). If service limit is exceeded, check splines on gears (36 , 40) and teeth of gears (17, 36) for wear and replace.

7> Gear backlash. Subtract value of compound backlash (reference letter K) from value of total backlash (reference letter J). If service limit is exceeded, check teeth on gears (40, 75) for wear, and replace.

8> Width

9> Circular tooth thickness. Discard part if there is visible evidence of wear. Measure at pitch diameter of 1.9375 inches.

10> Chordal tooth thickness measured at pitch diameter of 1.9375 inches.

11> Used for 69-37675-1.

12> Used for 65-76638-1.

13> Used for universal joint assembly 69-37652-5, -7, -10, -12 only.

14> If bearing surfaces of bushings (11) are free from cracks and local failure, and maximum clearance is 0.012 inch or less, remove bushings (11) from yoke (12) and shaft (13), rotate 180 degrees, and reinstall.

15> Bushing, DBAF16-083, 90585

16> Shaft (13, P/N 65-80934-1, -2)

17> Shaft (13, P/N 69-37620-5)

18> Shaft (13, P/N 69-37620-6)

19> Shaft 13, P/N 69-37620-7, 69-62744-1)

Fits and Clearances
Figure 601 (Sheet 5)

TESTING

1. Test Equipment

NOTE: Equivalent substitutes may be used.

A. Compressed air source, controlled at 0 to 15 psi

B. Air valve adapter

C. ST 6396: Transmission Tester (Curtiss Wright Corp. Caldwell Facility, 300 Fairfield Rd., Caldwell, New Jersey 07006)

D. X-Y Recorder:

(1) Model HP7090A (X-Y Recorder, Hewlett Packard Co., 3000 Hanover St., Palo Alto, California 94304 (Replaces HP7004B)

(2) Model 6423 DIN A3 (X-Y Recorder, Soltec Corp., Sol Vista Park, 12977 Arroyo St., San Fernando, California, 91340-1597). Replaces XY530T, Esterline Corporation, Esterline-Angus Division, P.O. Box 24000, 1201 Main St., Indianapolis, Indiana 46224

E. Model 870 Signal Conditioner (Daytronic Corp., 2589 Corporate Drive Place, Miamisburg, Ohio 45342) (2 required). No longer available, see G. below

F. Model 801 Adapter (Daytronic Corp., 2589 Corporate Drive Place, Miamisburg, Ohio 45342). No longer available, see G. below

G. Model 3170 or 3270 Strain Gage Conditioner (Daytronic Corp., 2589 Corporate Drive Place, Miamisburg, Ohio 45342). Replaces conditioner and adapter listed in E. and F.

2. Preparation for Test

A. Ensure that unit has been serviced with hydraulic fluid, MIL-H-5606.

B. Install air valve adapter in upper filler port.

C. Turn over coupling, by hand, in both directions. Gears and bearings must be free running without evidence of binding in any position.

D. With the output and universal shafts free, torque required to rotate input shaft in both directions shall not exceed 12 lb-in.

3. Functional Test (Fig. 1101)

   A. Connect air hose to air valve adapter in upper filler port, and pressurize with filtered air at 14.5-15.5 psi for minimum of 3 minutes. There shall be no leakage. Remove adapter and install plug (1) and O-ring (2) in upper filler port. Lockwire plug (1). Apply Glyptal to lockwire ends.

   B. With universal shaft locked, apply 45-55 lb-in. torque to input shaft in clockwise direction. Mark position of input shaft. Apply same torque in counterclockwise direction. Input rotational backlash shall not exceed 20 degrees.

   C. Mount assembly in test fixture (Fig. 701, 703).

   D. Connect torque transducers to X-Y recorder.

   E. Connect transmission input shaft to calibrated input torque transducer, and transmission output shaft to calibrated output transducer.

   F. Check that X-Y recorder is zeroed before any torque is applied to transmission.

   G. Draw vertical lines on X-Y recorder paper at minimum lockout input torque (215 1b-in.) and at maximum input torques (2540, 3000 lb-in.).

   H. Install manual input torque arm.

   CAUTION: DO NOT EXCEED INPUT TORQUE OF 3000 LB-IN. (FIG. 703) OR DAMAGE TO UNIT MAY OCCUR.

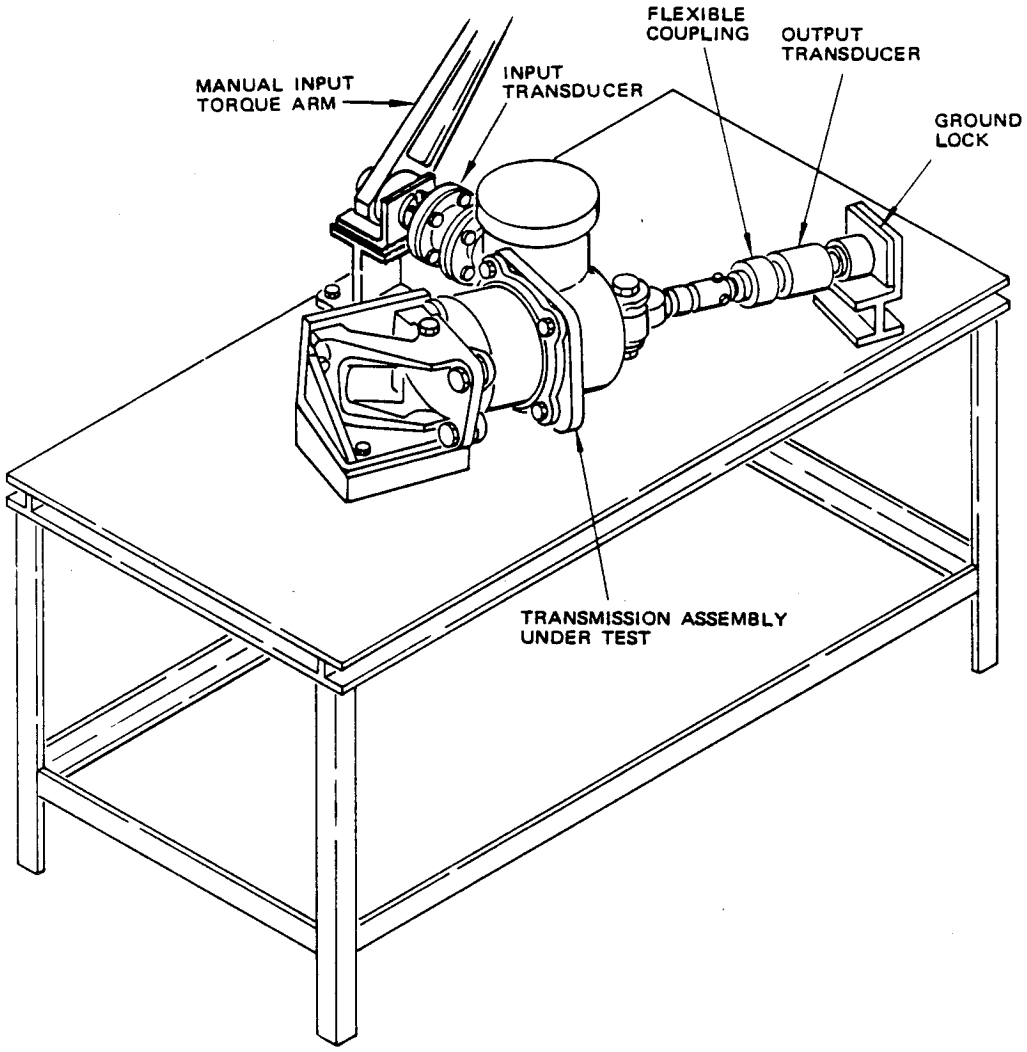
   I. Slowly turn the manual input torque arm in the clockwise direction until the input torque is at the maximum limit (Fig. 703).

   J. Make sure that the output torque at minimum lockout is not less than 588 lb-in. with a minimum input torque of 215 lb-in.

   K. Make sure that the output torque is not more than 715 lb-in. with a maximum input torque of 2540 lb-in.

   L. Repeat steps I thru K with counterclockwise input torque.

4. Deleted.



Test Fixture
Figure 701

Figure 702
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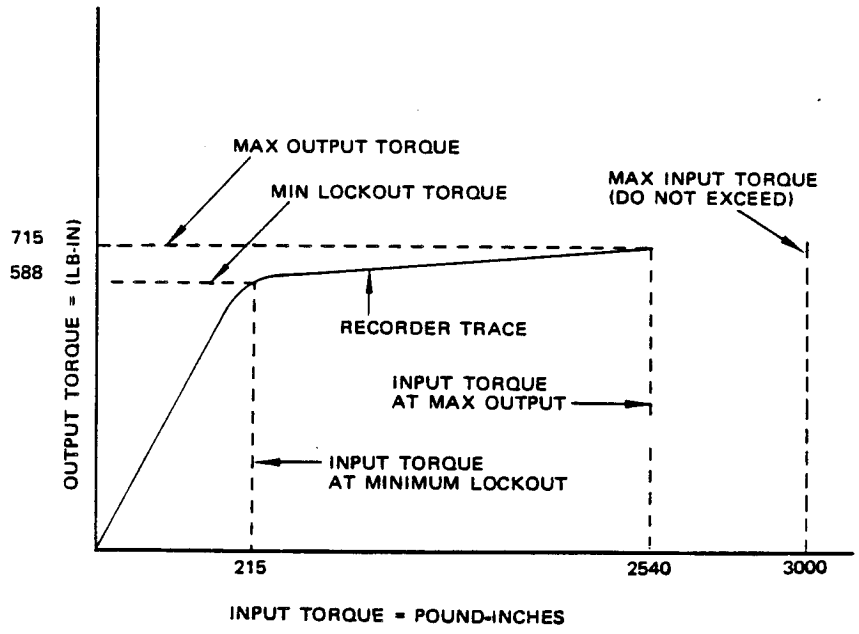


Torque Brake Test
Figure 703

TROUBLE SHOOTING

1. Trouble shooting is keyed to individual steps of the test procedure. Referenced paragraphs show test procedure in which the noted trouble would appear.

	Trouble	Possible Cause	Correction
A.	External leakage, paragraph 3.A.	Defective O-rings or seals	Replace O-rings or seals
B.	Binding or rough movement, paragraph 2.C.	Improperly installed or defective components	Correct condition
C.	Excessive backlash paragraph 3.B.	Inadequate shims or excessively worn components	Replace shims or other component
D.	Lockout occurs outside of minimum or maximum limits, paragraph 3.J., K.	Defective torque brake assembly	Replace or repair torque brake assembly

STORAGE INSTRUCTIONS

1. Fill unit with MIL-H-5606 hydraulic fluid or suitable preservative hydraulic oil.
2. Wrap assembly in vapor barrier paper and tape securely.
3. Tag assembly with test date, and cure date of rubber parts.
4. For further information, refer to Temporary Protective Coatings, Subject 20-44-02, and Protection Storage and Handling of Airplane Components, Subject 20-70-01.

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

NOTE: Equivalent substitutes may be used for listed items. Refer to Testing for special tools and equipment required for component test.

1. F71228-500 -- Splined Coupling Wrench (Boeing)

2. ST6107 -- Spring Pack Assembly Jig (Curtiss Wright Corp. Caldwell Facility, 300 Fairfield Rd., Caldwell, New Jersey 07006)

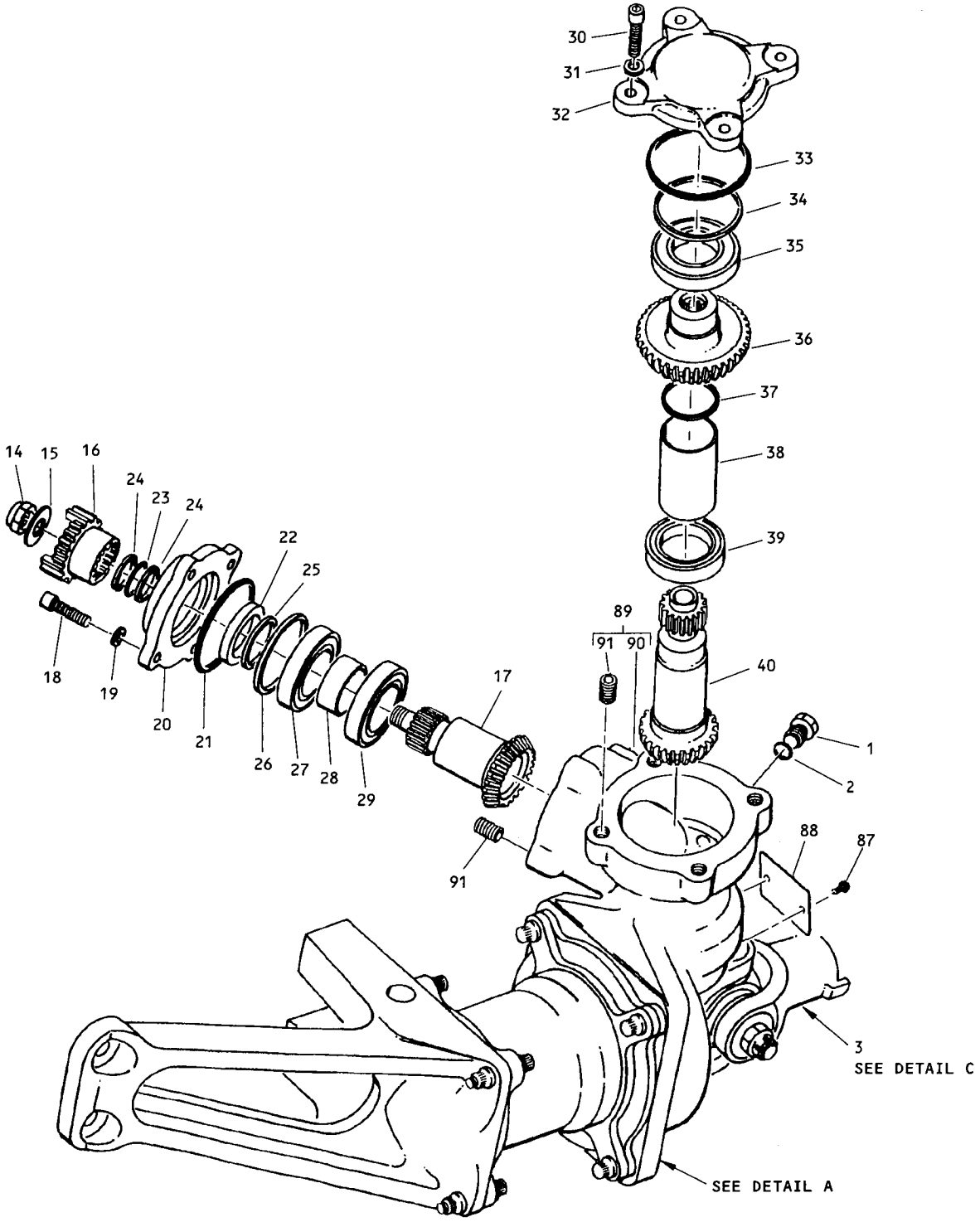
3. PT49001 -- Torque Bar (Curtiss Wright Corp. Caldwell Facility, 300 Fairfield Rd., Caldwell, New Jersey 07006)

4. ST6105-1-- Torque Wrench Adapter (Curtiss Wright Corp. Caldwell Facility, 300 Fairfield Rd., Caldwell, New Jersey 07006)

ILLUSTRATED PARTS LIST

VENDORS

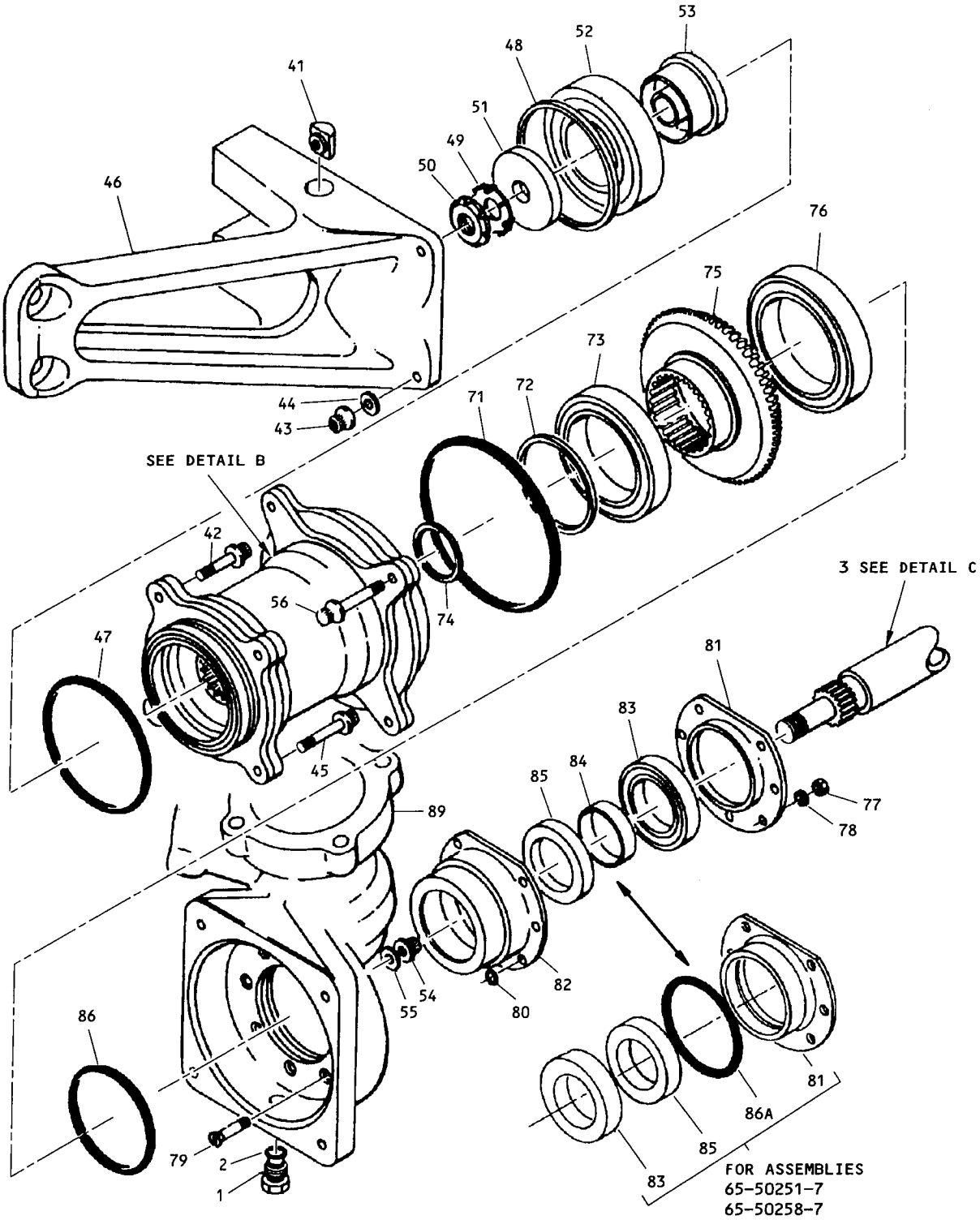
V09455	BFM TRANSPORT DYNAMICS CORP., 3131 W. SEGERSTROM AVE., SANTA ANA, CALIFORNIA 92702
V21335	TORRINGTON CO., FAFNIR BEARING DIV., 59 FIELD ST., TORRINGTON, CONNECTICUT 06790-1008
V38443	MRC BERAINGS, 402 CHANDLER ST., JAMESTOWN, NEW YORK 14701-3802
V40920	MPB MINIATURE PRECISION BEARING DIV., PRECISION PARK, P.O. BOX 547, KEENE, NEW HAMPSHIRE 03431
V71791	CURTISS-WRIGHT FLIGHT SYSTEMS, INC., 300 FAIRFIELD RD., NEW JERSEY 07006-1932
V73680	GARLOCK, INC., MECHANICAL PACKING DIV., SUB OF COLT IND., 1666 DIVISION ST., PALMYRA, NEW YORK 14522-9343
V80756	SPIROLUX DIV. OF KAYDON CORP., 29 CASSENS ST., ST. LOUIS, MISSOURI 63026-2542
V81376	SMITH ACQUISITION COMPANY, 2240 BUENA VISTA, BALDWIN PARK, CALIFORNIA 91706
V83259	PARKER-HANNIFIN CORP., O-SEAL DIV., 10567 JEFFERSON BLVD., CULVER CITY, CALIFORNIA 90232-3513



ASSEMBLY 65-50251 SHOWN

Trailing Edge Flap Drive Transmission Assemblies Nos. 1 and 8
Figure 1101 (Sheet 1)

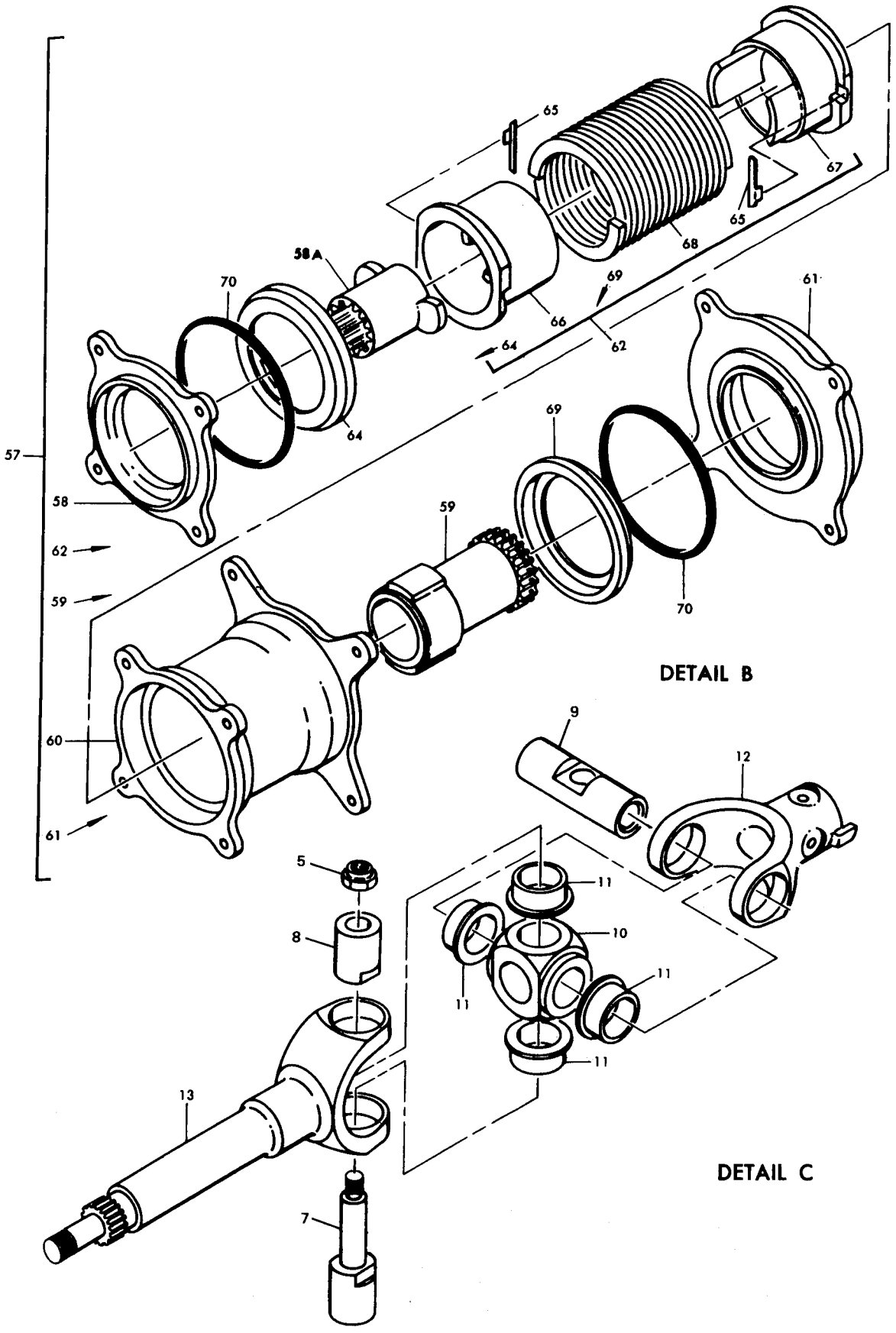
W76457



DETAIL A

Trailing Edge Flap Drive Transmission Assemblies Nos. 1 and 8
Figure 1101 (Sheet 2)

W76508



Trailing Edge Flap Drive Transmission Assemblies Nos. 1 and 8
Figure 1101 (Sheet 3)

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
	65-50251-2		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 1	A	
	65-50258-2		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 8	B	
	65-50251-4		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 1 (SB 27-1015)	C	
	65-50258-4		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 8 (SB 27-1015)	D	
	65-50251-5		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 1	E	
	65-50258-5		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 8	F	
	65-50251-6		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 1	G	
	65-50258-6		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 8	H	
	65-50251-7		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 1	I	
	65-50258-7		TRANSMISSION ASSY, TRAILING EDGE FLAP DRIVE NO. 8	J	
1	AN814-4DL		. PLUG		2
2	MS28778-4		. PACKING, O-RING		2
3	65-76600-1		. UNIVERSAL JOINT ASSY (PREF)	A-F	1
3	69-37652-10		. UNIVERSAL JOINT ASSY (SB 27-1015) (OPT)	A-F	1
3	69-37652-5		. UNIVERSAL JOINT ASSY (OPT)	AB	1
3	69-37652-12		. UNIVERSAL JOINT ASSY (SB 27-1015) (OPT)	A-D	1
3	69-37652-7		. UNIVERSAL JOINT ASSY (OPT)	AB	1
3	65-76600-1		. UNIVERSAL JOINT ASSY	GH	1
3	65-76600-4		. UNIVERSAL JOINT ASSY	IJ	1
4	69-37652-9		DELETED		
5	BACN10JC7C		. . NUT (REPLS NAS1022C7)(USED ON 69-37652-5,-7)		1
5	BACN10JC7		. . NUT (USED ON 65-76600-1,-4, 69-37652-10,-12)		1
6	BAC27DCT48		DELETED		
7	66-23909-1		. . BOLT (USED ON 69-37652-5,-7)		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
7	66-23909-2		. . BOLT (USED ON 69-37652-10,-12) (OPT TO 65-76604-1)		1
7	65-76604-1		. . BOLT (USED ON 65-76600-1,-4, 69-37652-10,-12)		1
8	66-23905-1		. . SPACER (USED ON 69-37652-5,-7)		1
8	69-60050-1		. . SPACER (USED ON 69-37652-10,-12) (PREF)		1
8	66-23905-1		. . SPACER (USED ON 69-37652-10,-12) (OPT)		1
8	69-60050-1		. . SPACER (USED ON 65-76600-1,-4)		1
9	66-23907-1		. . PIN, CROSS (USED ON 69-37652-5,-7)		1
9	69-60054-1		. . PIN, CROSS (USED ON 69-37652-10, . -12) (PREF)		1
9	66-23907-1		. . PIN, CROSS (USED ON 69-37652-10, -12) (OPT)		1
9	69-60054-2		. . PIN, CROSS (USED ON 65-76600-1,-4) (PREF)		1
9	69-60054-1		. . PIN, CROSS (USED ON 65-76600-1,-4) (OPT)		1
10	69-37675-1		. . CROSS, TRUNNION (USED ON 69-37652-5,-7)		1
10	65-76638-1		. . CROSS, TRUNNION (USED ON 69-37652-10,-12) (PREF)		1
10	69-37675-1		. . CROSS, TRUNNION (USED ON 69-37652-10,-12) (OPT)		1
10	65-76638-1		. . CROSS, TRUNNION (USED ON 65-76600-1,-4)		1
11	10-61899-16		. . BUSHING *[1]		4
11	DBAF16-083		. . BUSHING, V81376 (BOEING 10-60516-250) (OPT)		4
11	90585		. . BUSHING, V09455 (BOEING 10-60516-250) (OPT)		4
12	69-37642-1		. . YOKE (USED ON 69-37652-7,-12)		1
12	69-37642-3		. . YOKE (USED ON 69-37652-5,-10, 65-76600-1,-4) (PREF)		1
12	69-37642-2		. . YOKE (USED ON 69-37652-5,-10, 65-76600-1,-4) (OPT TO 69-37642-3)		1
13	69-37620-5		. . SHAFT (USED ON 69-37652-7, -12) (MODIFIED BY SB 27-1048) (REPLD BY 69-62744-1)		1
13	65-80934-1		. . SHAFT (USED ON 69-37652-5,-10) (MODIFIED BY SB 27-1048) (PREF) (REPLD BY 69-62744-1)		1
13	69-37620-6		. . SHAFT (USED ON 69-37652-5,-10, 65-76600-1)		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
13	69-80934-2		. . SHAFT (USED ON 65-76600-4) (PREF)		1
13	69-37620-7		. . SHAFT (USED ON 65-76600-4)		1
13	69-62744-1		. . SHAFT (REPLS 69-37620-5,-6, 65-80934-1 PER SB 27-1048)	A-H	1
14	BACN10JC6		. NUT (REPLS NAS679A6)		1
15	66-24715-1		. WASHER		1
16	69-37677-2		. COUPLING		1
17	69-37605-5		. GEAR		1
17	69-37605-4		. GEAR (OPT TO 69-37605-5)	A-D	1
17	69-37605-3		. GEAR (OPT TO 69-37605-5)	A-D	1
18	NAS1351-4H12P		. BOLT		4
19	AN960-416		. WASHER		4
20	66-24721-4		. RETAINER		1
21	2-036-N304-7		. O-RING, V83259		1
22	69-73393-3		DELETED		
22	67X363		. SEAL, V73680		1
22	21959-0363		. SEAL, V73680 (OPT)		1
23	69-37680-1		. O-RING		1
24	66-25129-1		. RING, BACKUP		2
25	66-24718-1		. SPACER		1
26	66-25105-2		. SHIM		1
27	106KS		. BEARING, V38443		1
27	BACB10BA30		. BEARING (OPT)(REPLS BACB10A17)		1
28	66-23920-2		. SPACER		1
29	106KS		. BEARING, V38443		1
29	BACB10BA30		. BEARING (OPT)(REPLS BACB10A17)		1
30	NAS1351-4H12P		. BOLT		4
31	AN960-416		. WASHER		4
32	69-37633-3		. COVER		1
33	MS28775-146		. PACKING, O-RING		1
34	66-25105-2		. SHIM		1
35	106KS		. BEARING, V38443		1
35	BACB10BA30		. BEARING (OPT)(REPLS BACB10A17)		1
36	69-37612-3		. GEAR		1
36	69-37612-2		. GEAR (OPT)		1
37	66-24700-1		. SHIM		1
38	66-23917-2		. SPACER		1
39	106KS		. BEARING, V38443		1
39	BACB10BA30		. BEARING (OPT)(REPLS BACB10A17)		1
40	69-37613-2		. GEAR		1
40	69-37613-1		. GEAR (OPT)		1
41	NAS577-5A		. NUT (REPLS NAS577-5)		2
42	BACB30MT5T10		. BOLT		2
43	BACN10HR5		. NUT (REPLS BACN10CT5)		2
44	AN960-516		. WASHER		2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
45	BACB30MT5T12		. BOLT		2
46	65-50290-5		. HOUSING	ACEGI	1
46	65-50290-6		. HOUSING	BDFHJ	1
47	2-042-N304-7		. O-RING, V83259		1
48	66-24730-2		. SHIM	BDFHJ	1
48	66-24730-1		. SHIM (OPT)	BDFHJ	1
48	66-24730-1		. SHIM	ACEGI	1
49	MS172273		. WASHER		1
50	69-37683-1		. NUT		1
51	66-23919-1		. RETAINER		1
52	209M		. BEARING, V38443 (SUPSD BY 9209H)		1
52	209W		. BEARING, V38443 (OPT) (SUPSD BY 9209H)		1
52	9209H		. BEARING, V38443 (SUPSDS 209M AND 209W)		1
53	69-37639-1		. ADAPTER		1
54	BACN10HR5		. NUT (REPLS BACN10CT5)		4
55	AN960-516		. WASHER		4
56	BACB30MT5T14		. BOLT		4
57	175896		. TORQUE BRAKE ASSY, V71791	A-D	1
57	176829		. TORQUE BRAKE ASSY, V71791	E-J	1
58	175831		. . SUPPORT , V71791		1
58A	175841		. . ADAPTER, V71791		1
59	175843		. . COUPLING, V71791		1
60	175824		. . HOUSING, V71791		1
61	175828		. . SUPPORT, V71791	A-D	1
61	176828		. . SUPPORT, V71791	E-J	1
62	175821		. . SPRING PACK ASSY, V71791		1
63	175841		DELETED		
64	175826		. . . RING, V71791		1
65	176278X		. . . SHIM, V71791		AR
66	175830		. . . SLEEVE, V71791		1
67	175829		. . . SLEEVE, V71791		1
68	175822		. . . SPRING, V71791		1
69	175826		. . . RING, V71791		1
70	2-043N304-7		. O-RING, V83259		2
71	2-156N304-7		. O-RING, V83259		1
72	66-24747-1		. SHIM	A-D	1
72	69-52450-1		. SHIM	E-J	1
73	HDF011-9		. BEARING, V40920	A-D	1
73	BACB10BB55		. BEARING (OPT) (REPLS BACB10A351)	A-D	1
73	111GE		. BEARING, V21335	E-J	1
74	RR168		. RING, V80756		1
75	65-50298-3		. GEAR	A-D	1
75	69-52421-1		. GEAR	E-J	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
76	HDF012-4		. BEARING, V71791		1
76	BACB10BB60		. BEARING (OPT) (REPLS BACB10A352)		1
77	BACN10JC4		. NUT (REPLS NAS679A4W)		7
78	AN960-416		. WASHER		7
79	NAS584-11		. SCREW	A-H	7
79	BACB30JC8-12		. SCREW (REPLS NAS584-11) (SB 27-1048)	A-H	7
79	BACB30JC8-12		. SCREW	IJ	7
80	MS28775-010		. PACKING, O-RING		7
81	69-37686-1		. RETAINER	A-H	1
81	69-62735-1		. RETAINER (REPLS 69-37686-1 PER SB 27-1048)	A-H	1
81	69-62735-1		. RETAINER	IJ	1
81	69-62735-2		. RETAINER (OPT)	IJ	1
82	69-37668-5		. SUPPORT	A-H	1
82	69-37668-3		. SUPPORT (OPT TO 69-37668-5)	A-H	1
82	69-37668-4		. SUPPORT (REPLS 69-37668-3 PER SB 27-1048)	A-H	1
82	69-62734-1		. SUPPORT	IJ	1
82	69-37668-4		. SUPPORT (OPT)	IJ	1
83	HDF007-P3		. BEARING, V40920 (REPLS 21959-0535 PER SB 27-1048)	IJ	1
83	HDFZZ007-9		. BEARING, V40920 (OPT)	IJ	1
83	HDFZZ007-9		. BEARING, V40920	A-H	1
83	WR1907SD602F A3		. BEARING (OPT TO HDFZZ007-9)	A-H	1
84	66-24743-1		. SPACER (DELETED BY SB 27-1048)	A-H	1
85	69-73393-4		. SEAL, V73680 (OPT)		1
85	21959-0535		. SEAL, V73680 (REPLS HDFZZ007-9 PER SB 27-1048) (OPT)		1
85	67X535		. SEAL, V73680 (OPT)		1
85	69-73393-11		. SEAL (PREF)		1
86	MS28775-144		. PACKING, O-RING		1
86A	MS28775-139		. O-RING (ADDED BY SB 27-1048)	IJ	1
87	NAS601-4P		. SCREW (REPLS AN515-6R4)		2
88	66-25101-1		. NAMEPLATE		1
89	65-50287-1		. HOUSING ASSY	ACEGI	1
89	65-50287-2		. HOUSING ASSY	BDFHJ	1
90	65-50280-11		. . HOUSING	ACEGI	1
90	65-50280-14		. . HOUSING	BDFHJ	1
91	MS21208F4-15		. . INSERT (REPLS MS124696)		8

*[1] REPLS DBAF16-083, 90585.