

TO: ALL HOLDERS OF RUDDER AND ELEVATOR FEEL ACTUATOR CYLINDER ASSEMBLY
 OVERHAUL MANUAL, 27-09-09

REVISION NO. 33, DATED JUL 1/07

HIGHLIGHTS

DESCRIPTION OF CHANGE	TOPICS AFFECTED												
	D & O	D / A s s y	C l e a n i n g	I n s p / C h k	R e p a i r	A s s y	F / C	T e s t	T / S h o o t i n g	S / T o o l s	S t o r a g e	I P L	L / O v e r h a u l
Added adapter A27035-1 Added extra view of F80085 test fixture Updated IPL Figure note		X				X		X		X		X	

RUDDER AND ELEVATOR FEEL ACTUATOR CYLINDER ASSEMBLY

27-09-09

BOEING P/N 65-44503-3 thru -10
65-45134-3
65-45140-5

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30148	Nov 15/67
		PRR 30618	Nov 15/67
		PRR 30651	Aug 15/68
		PRR 30951	Aug 15/68
		PRR 24025-28	Nov 10/79
		PRR 33467	Mar 5/84
		PRR 34103-1	Jun 5/88

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
27-09-09		1107	Sep 5/90		
T-1	Sep 5/90	1108	BLANK		
T-2	BLANK				
* LEP-1	Jul 1/07				
LEP-2	BLANK				
T/C-1	Sep 5/88				
T/C-2	BLANK				
1	Nov 10/79				
2	Nov 10/79				
* 101	Jul 1/07				
102	BLANK				
301	Nov 10/79				
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401	Sep 1/95				
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407	Mar 1/99				
408	Sep 1/95				
* 501	Jul 1/07				
502	Mar 1/95				
503	Mar 1/95				
504	BLANK				
601	Nov 1/00				
602	Dec 5/86				
* 701	Jul 1/07				
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* 706	BLANK				
801	Sep 1/95				
802	BLANK				
901	Mar 5/84				
902	BLANK				
* 1001	Jul 1/07				
1002	BLANK				
1101	Nov 15/67				
* 1102	Jul 1/07				
1103	May 20/92				
1104	Dec 5/93				
1105	Jun 1/96				
1106	Jun 25/73				

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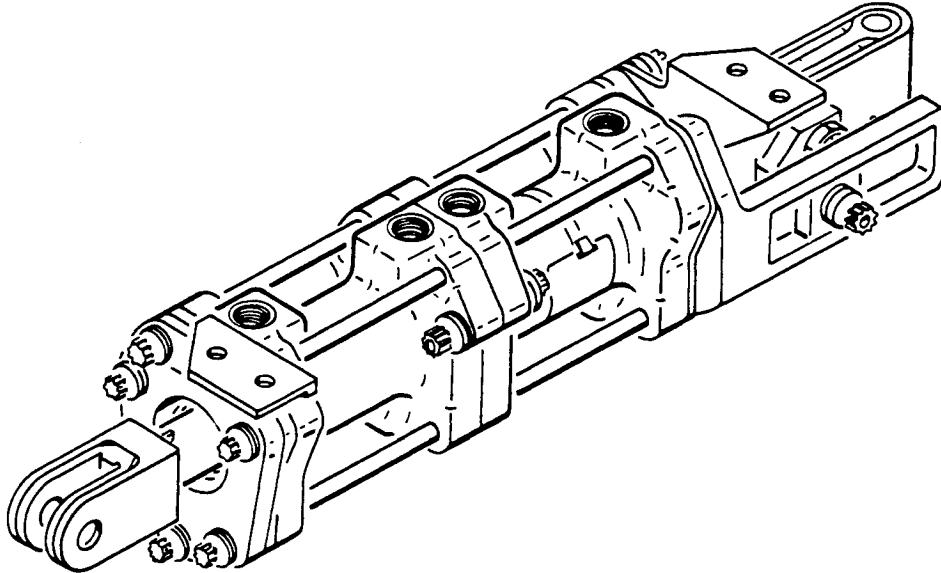
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*[1] Special instructions not required. Use standard industry practices and the information contained in 20-30-03.

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RUDDER AND ELEVATOR FEEL ACTUATOR CYLINDER ASSEMBLY



Rudder and Elevator Feel Actuator Cylinder Assembly
Figure 1

DESCRIPTION AND OPERATION

1. The rudder and elevator feel actuator cylinder assembly consists of two cylinder and piston units held together with tie bolts, and mounting bolts through the center flange faces. The cylinder bores are separated by two dams, and each cylinder encloses a movable piston. A clevis attaches to the protruding end of each piston. On some units, on one end of the assembly, a trunnion is mounted on the clevis, and a slide block assembly prevents the piston from rotating. Hydraulic pressure and return ports are provided at the top of each cylinder and piston unit for connection to the feel computer.

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2. The cylinder is part of the aircraft rudder and elevator feel and centering mechanism. The elevator and rudder feel computer directs varying hydraulic fluid pressure to the cylinders providing artificial feel for the pilot and centering elevator and rudder.

3. Leading Particulars (approximate) (cylinder assy only)

Length -- 14 inches

Height -- 3.5 inches

Width -- 3.25 inches

Weight -- 6 pounds

Operating Medium -- BMS 3-11 hydraulic fluid

Operating Pressure -- 50-2150 psi (variable input)

Proof Pressure -- 4600 psi

Stroke (installed) -- 1.67-1.73 inches

DISASSEMBLY

1. Remove parts (1 thru 16, Fig. 1102) from cylinder ports.
2. Disassemble parts (1 thru 8) (Fig. 1101).
3. Pull out pistons (42) together with bearings (50) and attached parts from barrels (62).
4. Cut lockwire and remove spring pins (9). Unscrew redundant rods (14). Disassemble parts (10 thru 13).
5. On cylinder assemblies 65-44503-3 thru -6, and -9, disassemble parts (16 thru 27, 30, 31 and 36), if used.
6. Bend back tabs of lockwashers (15). Unscrew clevis assemblies (37) using adapter A27035-1. Remove lockwashers (15), retainer (43), retainer guide (44), scrapers (45) and bearings (50).
7. Remove seal assembly (40) from piston (42), and parts (46 thru 49) from bearings (50).
8. Disassemble parts (51 thru 54) to separate barrels.
9. Push out dams (56) and remove O-rings (55).
10. Remove strap (57) and nameplate (58).

NOTE: Keep barrels (62) together as a matched set.

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INSPECTION/CHECK

1. Check all parts for obvious defects in accordance with standard industry practices. Refer to Fig. 601 for design dimensions and wear limits.
2. Penetrant check bearings (50), dams (56) and barrels (62, Fig. 1101) per 20-20-02.
3. Magnetic particle check piston (42, Fig. 1101) per 20-20-01.

REPAIR

1. Materials

Primer -- BMS 10-11, type 1 (Ref 20-60-02)

2. Repair

A. Repair minor defects in accordance with standard industry practices. Refer to Fits and Clearances for design dimensions and wear limits.

B. Bolt (28) (Fig. 401).

(1) Machine diameters A and B as required to remove corrosion and defects. Maintain limits and dimensions shown.

(2) Shot peen as indicated.

(3) Restore repaired surface to design dimensions and finish by stainless steel flame spray as indicated.

C. Piston (42) (Fig. 401)

(1) Machine diameters A and B as required to remove corrosion and defects. Maintain limits and dimensions shown.

(2) Shot peen as indicated.

(3) Restore repaired surface to design dimensions and finish by stainless steel plasma flame spray or chrome plate as indicated.

D. Trunnion Assy (31)

(1) Remove bushing (35A) and machine hole in trunnion (32) tee as required to remove defects. Do not exceed diameter of 0.6255 inch.

(2) Shot peen.

(3) Manufacture repair bushing per Fig. 402. Install bushing by shrink fit method per 20-50-03 with wet primer BMS 10-11, type 1. Machine bore to dimensions and finish shown.

E. Clevis assy (37) (Fig. 401)

(1) Machine diameter A, as required, to remove corrosion or defects. Maintain limits and dimensions shown.

(2) Shot peen as indicated.

(3) Restore repaired surface to design dimensions and finish by chrome plating as indicated.

F. Retainer (44) (Fig. 401)

- (1) Machine slot as required to remove corrosion or defects. Maintain limits and dimensions shown.
- (2) Shot peen as indicated.
- (3) Restore repaired surface to design dimensions by aluminum alloy flame spray as indicated.

G. Bearing (50) (Fig. 401)

- (1) Machine diameter A, as required, to remove defects or corrosion. Maintain limits and dimensions shown.
- (2) Shot peen as indicated.
- (3) Restore repaired surface to design dimensions and finish by aluminum-bronze flame spray as indicated.

2. Refinish

NOTE: Refer to 20-30-02 for stripping of protective finishes, and to 20-41-01 for explanation of F and SRF finish codes.

- A. Brackets (3, 4, Fig. 1101; 13, Fig. 1102), backup rings (12, 12A, 47), retainers (43, 44) dam (56) -- Chromic acid anodize (F-2.26) all over. Material: Al alloy.
- B. Tie bolt (5, 6) -- Passivate (F-8.07) all over. Material: 17-4PH CRES, 180-200 KSI.
- C. Bolt (28), clevis (37), piston (42), retainer (44), bearing (50) -- Fig. 401.
- D. Trunnion assy (32) -- Cadmium plate (F-1.1929) and apply primer, BMS 10-11, type 1 (SRF-12.205). Material: 4340 steel, 160-180 ksi.
- E. Barrel assy (59) -- Fig. 401.

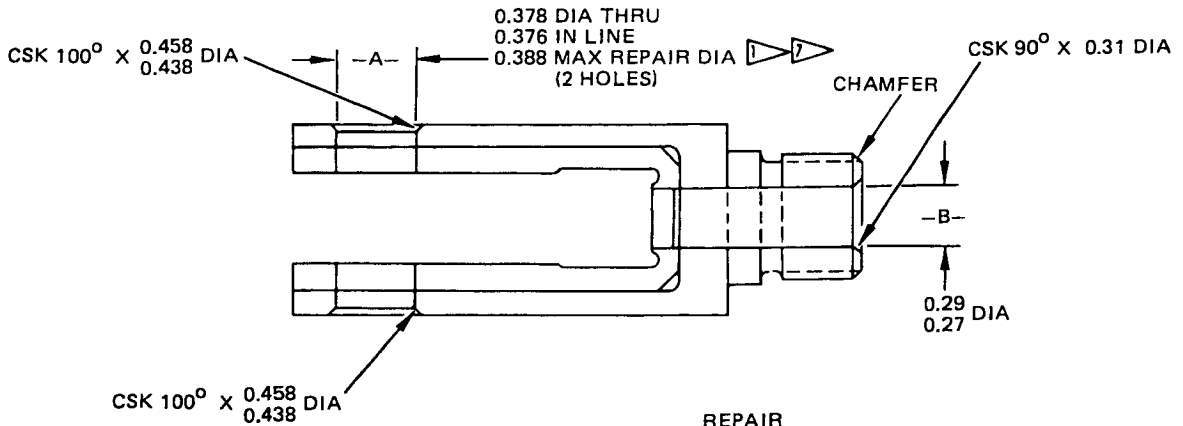
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3. Replacement

- A. Replace cotter pin (22), washers (15), O-rings (11, 11A, 46, 49, 55) and channel seals (48).
- B. Inserts (61) -- Install new inserts using wet primer, BMS 10-11, type 1, 1/4 to 1/2 turn below surface of barrel. Remove tang.
- C. Dowel pins (60) -- Remove existing pin and install new pin using wet primer, BMS 10-11, type 1, leaving 0.250-inch length of pin extending above surface.
- D. Bushing (35A) -- Remove and install new bushing per 20-50-03 with wet primer, BMS 10-11, type 1.

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REFINISH

PASSIVATE (F-8.07) ALL OVER

REPAIR

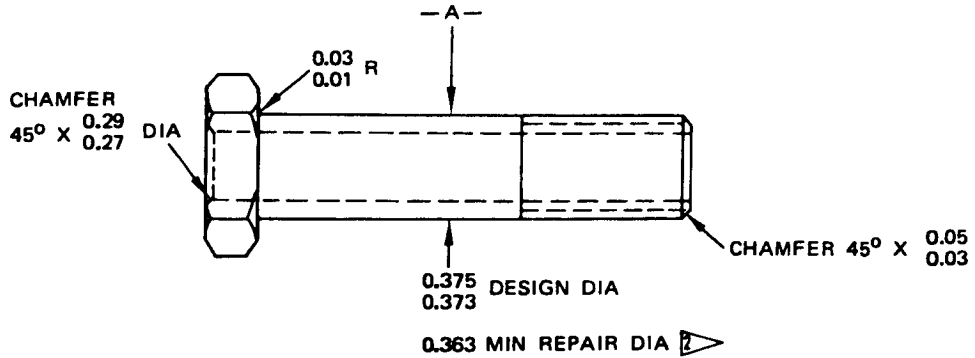
REF 

SHOT-PEEN (REF 20-10-03)

330-460 SHOT SIZE
0.009-0.014 A2 INTENSITY
2.0 COVERAGE

MATERIAL: 17-4PH CRES STEEL (180-200 KSI)

CLEVIS ASSY(37)



REFINISH

PASSIVATE (F-8.07) ALL OVER

REPAIR

REF 

SHOT-PEEN: (REF 20-10-03)

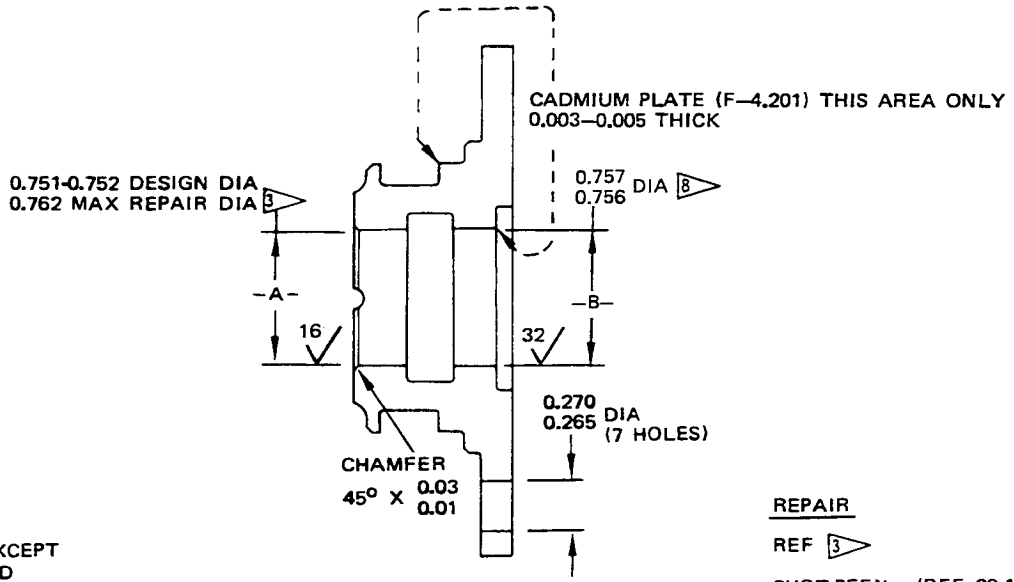
330-460 SHOT SIZE
0.09-0.014 A2 INTENSITY

MATERIAL: 17-4PH CRES (180-200 KSI)

BOLT (28)

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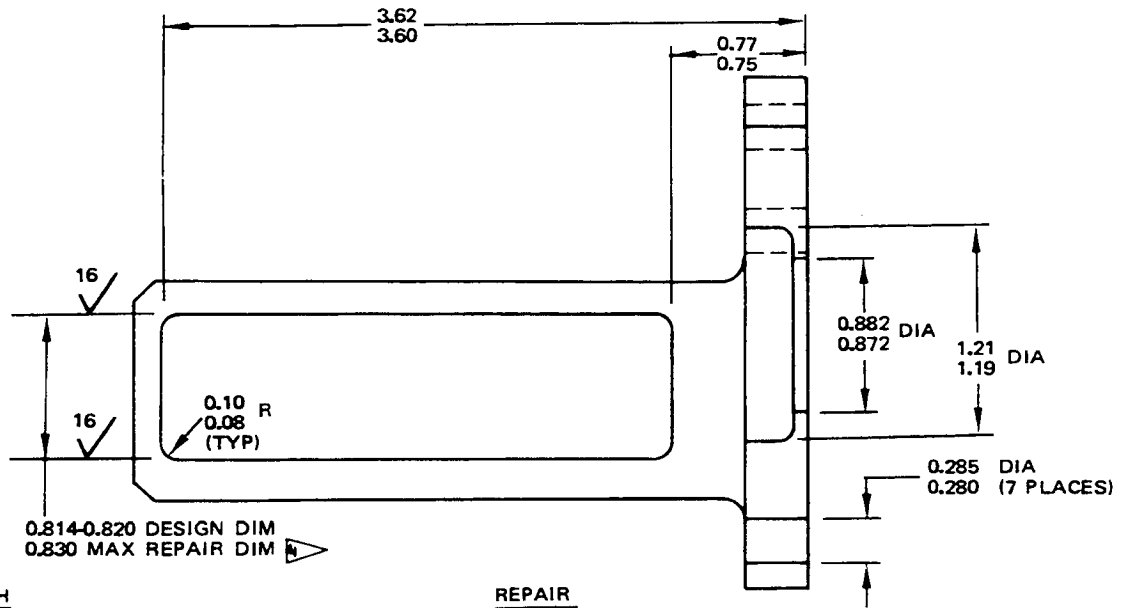


REFINISH
 NO FINISH EXCEPT
 AS INDICATED

REPAIR
 REF 3

SHOT-PEEN: (REF 20-10-03)
 330-460 SHOT SIZE
 0.009-0.014 A2 INTENSITY
 2.0 COVERAGE
 MATERIAL: AL-NI BRONZE

BEARING (50)

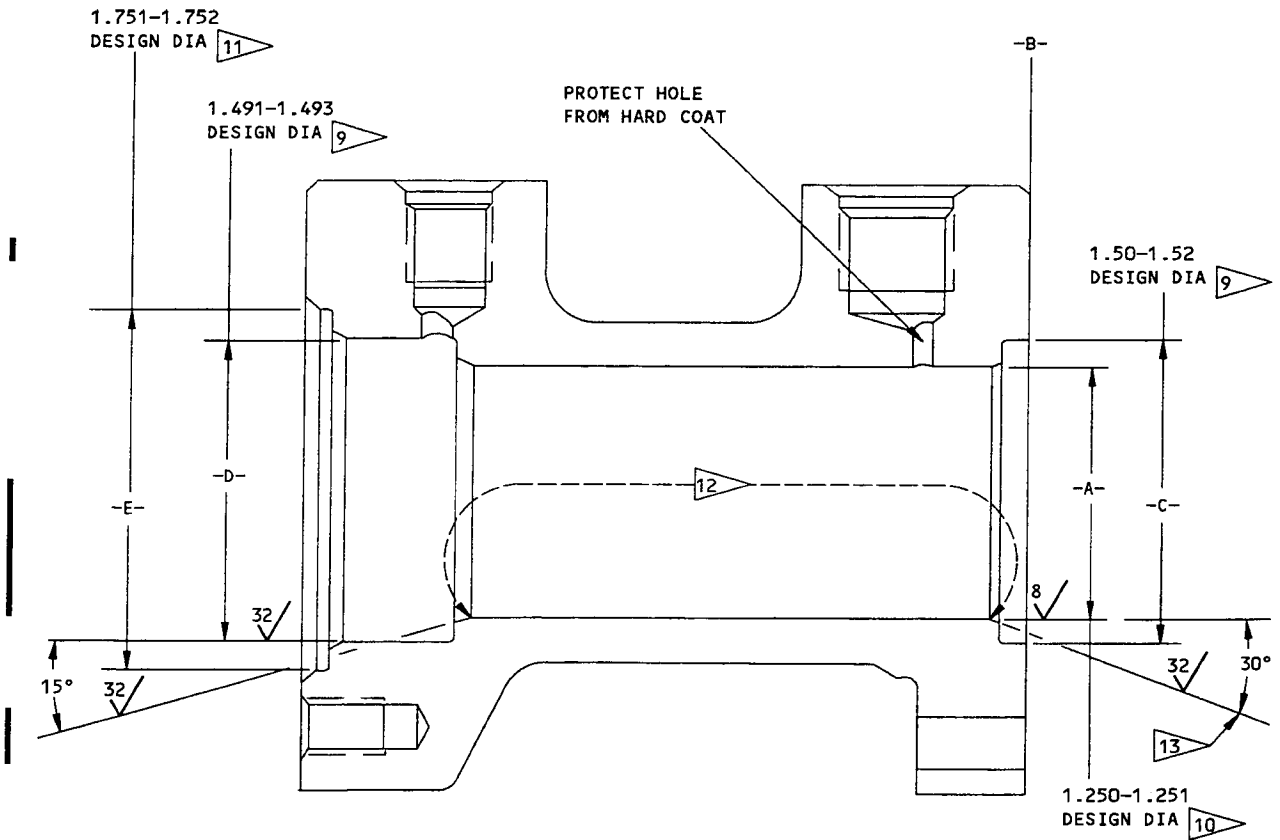


REFINISH
 CHROMIC ACID ANODIZE
 (F-2.26) ALL OVER

REPAIR
 REF 4

125 ✓ ALL MACHINED SURFACES EXCEPT AS NOTED
 BREAK ALL SHARP EDGES 0.005-0.01R
 SHOT-PEEN: (REF 20-10-03)
 80-160 SHOT SIZE
 0.009-0.014 A2 INTENSITY
 2.0 COVERAGE
 MATERIAL: AL ALLOY

RETAINER (44)



BARREL (59)

REFINISH

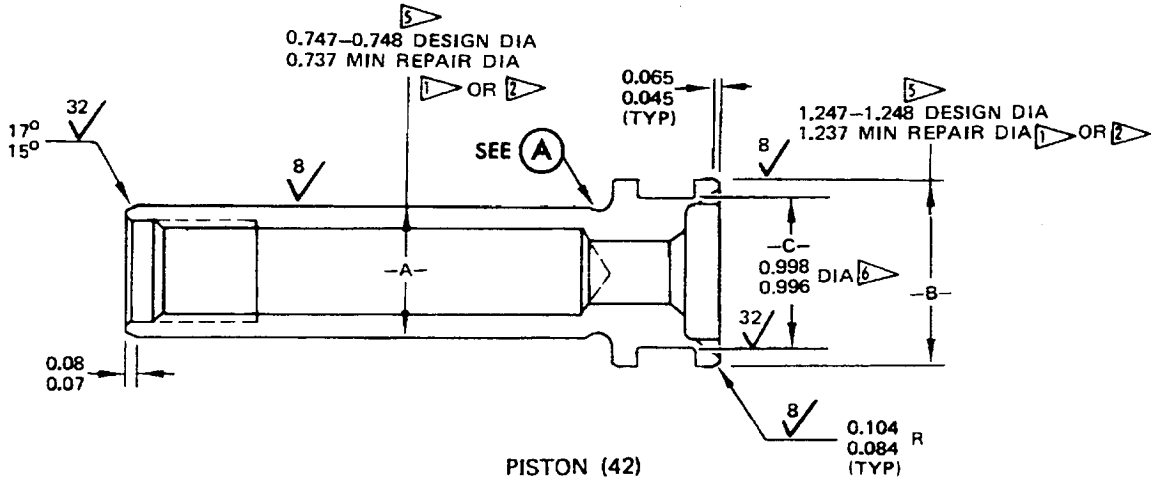
MATERIAL: AL ALLOY

HONE BARREL I.D. TO 1.251-1.252 INCHES DIAMETER. SURFACE FINISH SHOULD BE 25 MICROINCHES. ANODIZE (F-2.204) THE INDICATED AREA OF THE PISTON BORE, 0.0020-0.0025 INCH THICK. HONE BARREL I.D. TO FINAL DIAMETER OF 1.250-1.251 INCHES AND SURFACE FINISH OF 8 MICROINCHES. FOR ALL OTHER SURFACES EXCEPT HOLES WITH THREADED INSERTS, FLASH HARD ANODIZE 0.0002-0.0003 INCH THICK AND SODIUM DICHROMATE SEAL. (OPTIONAL: CHROME ACID ANODIZE (F-17.04) AND SEAL IN 5 PERCENT, PLUS OR MINUS 1 PERCENT, NICKEL OR COBALT ACETATE SOLUTION)

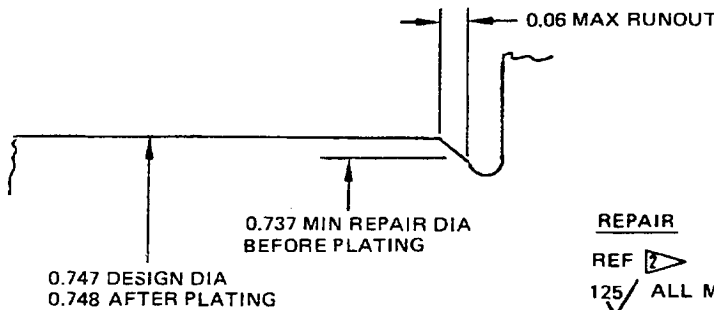
Repair Diagram
Figure 401 (Sheet 3)

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PISTON (42)



A

REFINISH

PASSIVATE (F-8.07) ALL OVER

REPAIR

REF **2**

125/ ALL MACHINED SURFACES EXCEPT AS NOTED

BREAK ALL SHARP EDGES 0.010-0.015R

SHOT-PEEN: (REF 20-10-03)

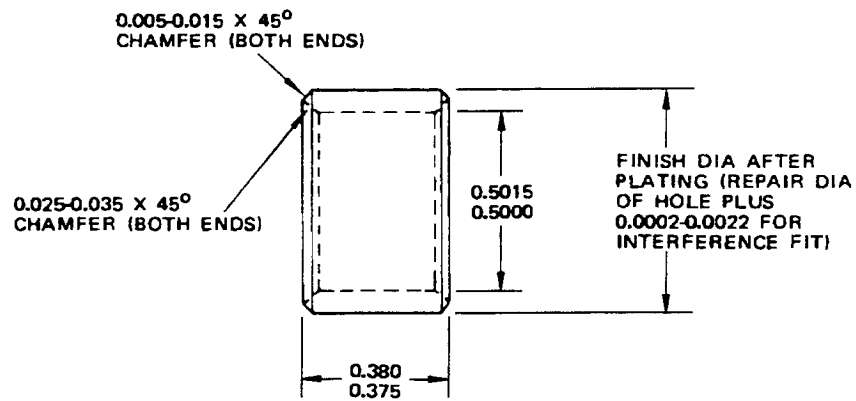
160-330 SHOT SIZE
0.009-0.015 A2 INTENSITY
2.0 COVERAGE

MATERIAL: 17-4PH CRES (180-200 KSI)

- 1** BUILD UP WITH CHROME PLATE (REF 20-42-03) AND GRIND TO FINISH AND DIMENSIONS SHOWN. OBSERVE 0.06 PLATING RUNOUT AT EDGES.
- 2** BUILD UP WITH STAINLESS STEEL PLASMA FLAME SPRAY (REF 20-10-05) BMS 10-67, TYPE 8 AND MACHINE TO FINISH AND DIMENSIONS SHOWN.
- 3** BUILD UP WITH ALUM-BRONZE PLASMA FLAME SPRAY (REF 20-10-05) BMS 10-67, TYPE 2 AND MACHINE TO FINISH AND DIMENSIONS SHOWN.
- 4** BUILD UP WITH ALUM ALLOY PLASMA FLAME SPRAY (REF 20-10-05) BMS 10-67, TYPE 10 AND MACHINE TO FINISH AND DIMENSIONS SHOWN.
- 5** DIAS -A- AND -B- SHALL BE CONCENTRIC WITH EACH OTHER WITHIN 0.001.

- 6** DIAS -B- AND -C- SHALL BE CONCENTRIC WITH EACH OTHER WITHIN 0.003
- 7** DIA -B- PERPENDICULAR TO DIA -A- WITHIN 0.001
- 8** DIAS -A- AND -B- SHALL BE CONCENTRIC WITH EACH OTHER WITHIN 0.002
- 9** DIAS -C- AND -D- SHALL BE CONCENTRIC WITH DIA -A- WITHIN 0.003
- 10** DIA -A- PERPENDICULAR TO SURFACE -B- WITHIN 0.0005
- 11** DIAS -A- AND -E- SHALL BE CONCENTRIC WITH EACH OTHER WITHIN 0.001
- 12** ANODIZE (F-2.204) ENCLOSED AREA ONLY
- 13** ANODIZE (F-2.204) RUNOUT OPTIONAL THIS SURFACE

Repair Diagram
Figure 401 (Sheet 4)



REPAIR BUSHING

(TO REPLACE BUSHING (35A) AND FOR
USE ON TRUNNION 69-38915-1)

FINISH

CADMIUM PLATE (REF 20-42-05),
0.0003 INCH THICK (OPTIONAL ON ID)

MATERIAL: 17-4PH (RES PER AMS 5643
(180-200 KSI)

ALL DIMENSIONS ARE IN INCHES

Repair Bushing Details
Figure 402

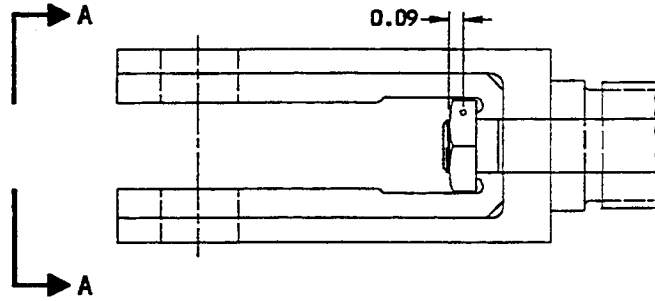
ASSEMBLY

1. Materials
 - A. Hydraulic Fluid -- BMS 3-11 (Ref 20-60-03)
 - B. Assembly Lube -- MCS 352 (Ref 20-60-03)
 - C. Grease -- BMS 3-24 (Ref 20-60-03)
2. General
 - A. Lightly lubricate all packings and channel seals at assembly with hydraulic fluid or assembly lube.
 - B. At assembly of piston rod and rod end, lubricate thread and thread relief cavities on rod with BMS 3-24 grease. Lubricate all other threads before assembly with MCS-352.
3. Install O-rings (55) on dams (56). Push dam into inner end of barrel (62) bore. Assemble barrels with bolts (54), washers (53 and 52), and nuts (51). Tighten nuts (51) to 80-100 lb-in.
4. Position nameplate (58) on one barrel. Secure with strap (57).
5. Install O-rings (49), channel seals (48), backup rings (47) and O-rings (46) on bearings (50).
6. Install bearings (50), scrapers (45), guide retainer (44) and retainer (43) on pistons (42) using Feel Actuator Piston Alignment Pin B27070-1, or equivalent.
7. On cylinder assemblies 65-44503-3 thru -6, and -9, insert bushing (30) in bore of trunnion (31). Preassemble one clevis (37), bearing support (36), trunnion (31) and bolt (27). Secure with washer (26), nut (25), washer (24), nut (23) and cotter pin (22). Tighten nut (25) to 70-90 lb-in., and nut (23) to 30-40 lb-in.
8. Slide lockwashers (15) on clevises (37). Fill cavities of clevises and piston rod ends with assembly lube.
9. Screw clevises (37) into piston rods, ensuring that preformed tab on lockwashers (15) seats in piston rod slot, and that shaft of bearing support (36), if used, protrudes through guide opening of guide retainer (44). Tighten clevises to 260-280 lb-in using adapter A27035-1. Bend over a minimum of two tabs of lockwashers protruding beyond surface of clevis assembly.

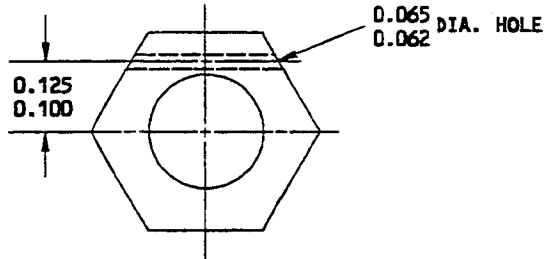
10. Assemble washers (13), backup rings (12) and O-rings (11) on redundant rods (14). Carefully slide redundant rods into bore of pistons (42) and screw into nuts (10). Tighten nuts (10) to 63-77 lb-in. Secure with spring pins (9). Lockwire nuts (10) by threading wire through pin and around nut face. If holes for spring pin (9) do not align, drill new 0.062-0.065 inch hole on opposite side of nut (10) (Fig. 501).
11. Install seal assemblies (40) in piston grooves. Carefully slide pistons (42) into barrel bores. Secure with washers (8) and bolts (7). Tighten bolts to 80-100 lb-in.
12. On cylinder assemblies 65-44503-3 thru -6, and -9, install bushing (21) in bore of slide block (18). Position slide block in slot of guide retainer (44) and on shaft of bearing support (36). Secure with washer (17) and nut (16). Tighten nut (16) to 80-100 lb-in.
13. Install tie bolts (5, 6) and brackets (3, 4) on barrel (59). Secure with washers (2) and nuts (1). Tighten nuts (1) to 63-77 lb-in.
14. Deleted

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CLEVIS ASSY (37)



NUT (10)

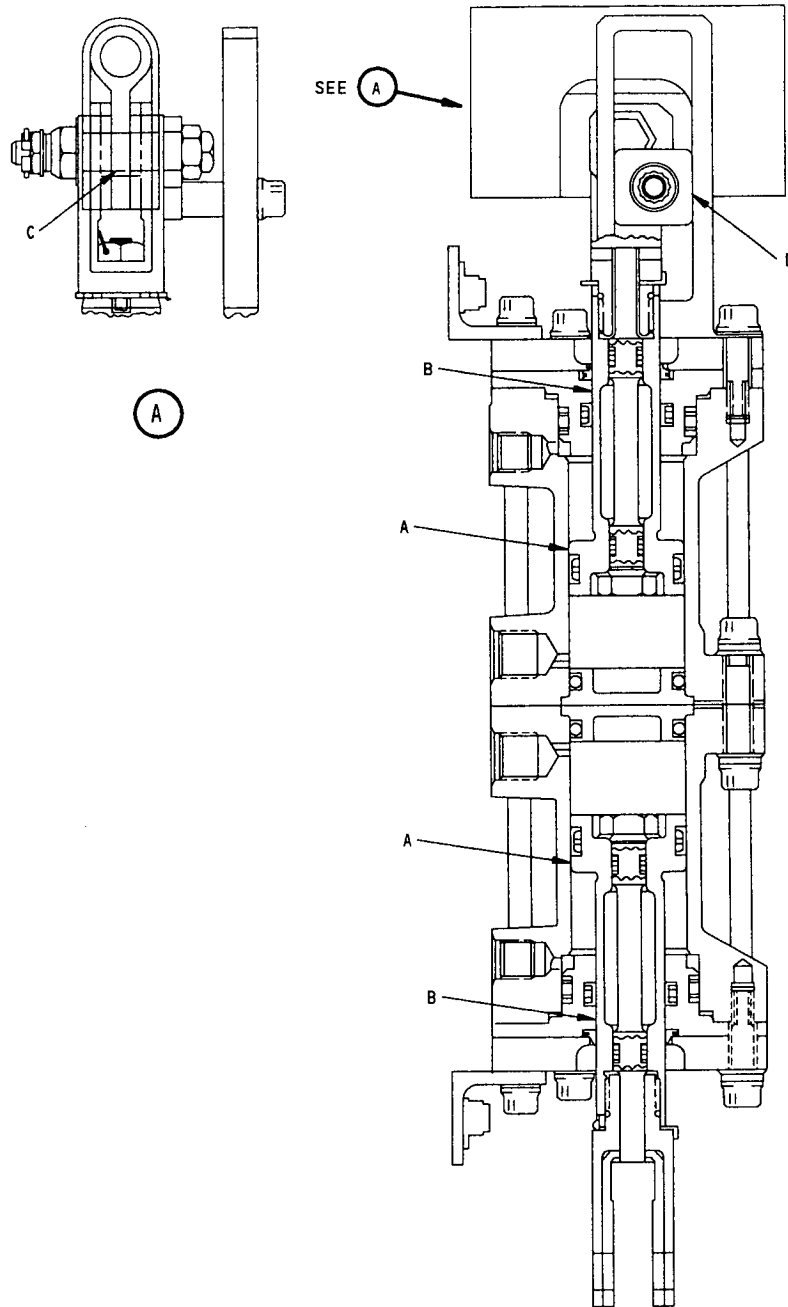
A-A

Spring Pin Hole Location
Figure 501

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FITS AND CLEARANCES



Fits and Clearances
Figure 601 (Sheet 1)

		Design Dimensions				Service Wear Limits		
Ref. Letter Fig. 601	Mating Item No. Fig. 1101	Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inches)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
A	ID 62	1.250	1.251	0.002	0.004	1.242	1.256	0.008
	OD 42	1.247	1.248					
B	ID 50	0.756	0.757	0.008	0.010	0.746	0.758	0.010
	OD 42	0.747	0.748					
C	ID 31,35A	0.5020	0.5050	0.0007	0.0044	0.4960	0.5073	0.006
	OD 30	0.5006	0.5013					
D	*[1] 44	0.814	0.820	0.006	0.020	0.774	0.848	0.040
	*[2] 18	0.800	0.808					

*[1] Width of slot
 *[2] Width of slide block

Fits and Clearances
 Figure 601 (Sheet 2)

FOR TORQUE VALUES OF STANDARD FASTENERS, REFER TO 20-50-01			
FIG. 1101 ITEM NO.	NAME	TORQUE	
		POUND-INCHES	POUND-FEET
1	Nut	63-77	
7	Bolt	80-100	
10	Nut	63-77	
16	Nut	80-100	
23	Nut	30-40	
25	Nut	70-90	
37	Clevis	260-280	
51	Nut	80-100	

TESTING

1. Test Equipment (Fig. 1101)

- A. Assembly test fixture F80085-1, or equivalent test fixture which will rigidly hold cylinder assemblies 65-44503-3, -4, -5, -6, -9 at a fixed center distance of 13.685-13.715 inches. That measurement is from the clevis (37) bolt hole centerline of the trunnion assembly (31) 0.445-0.439 dia. bore. Assembly test fixture F80085-1 and adapter assembly F80085-12, or equivalent test fixture and adapter, which will rigidly hold cylinder assemblies 65-44503-7, -8, -10 at a fixed center distance of 12.685-12.715 inches. That measurement is from one clevis (37) bolt hole centerline to the other clevis (37) bolt hole centerline. Body of the unit must be free to move horizontally over full stroke distance in both directions (Fig. 702, 703).
- B. Hydraulic test stand capable of supplying hydraulic pressure from two separate sources controllable from 0 to 4600 psi.
- C. Device capable of measuring stroke in 0.001 inch increments.
- D. Spring scale, 25 pound capacity.
- E. Pressure gages, 0 to 5000 psi.

2. Preparation for Test

- A. Filter test fluid to levels shown in Fig. 701.
- B. Assemble items (1 thru 16, Fig. 1102) to ports of cylinder, and to bracket (13, Fig. 1102), if used. Refer to Fig. 702 for location of test ports.
- C. Cycle both pistons until all air is removed from unit.
- D. Conduct all tests at room temperature using hydraulic fluid BMS 3-11. Use of Skydrol 7000 is optional.

Particle Size (microns)	Max. Quantity per 100 ml
10-25	6,000
26-50	1,400
51-100	400
101-150	20
Over 150	0

Hydraulic Fluid Filtering Limits
Figure 701

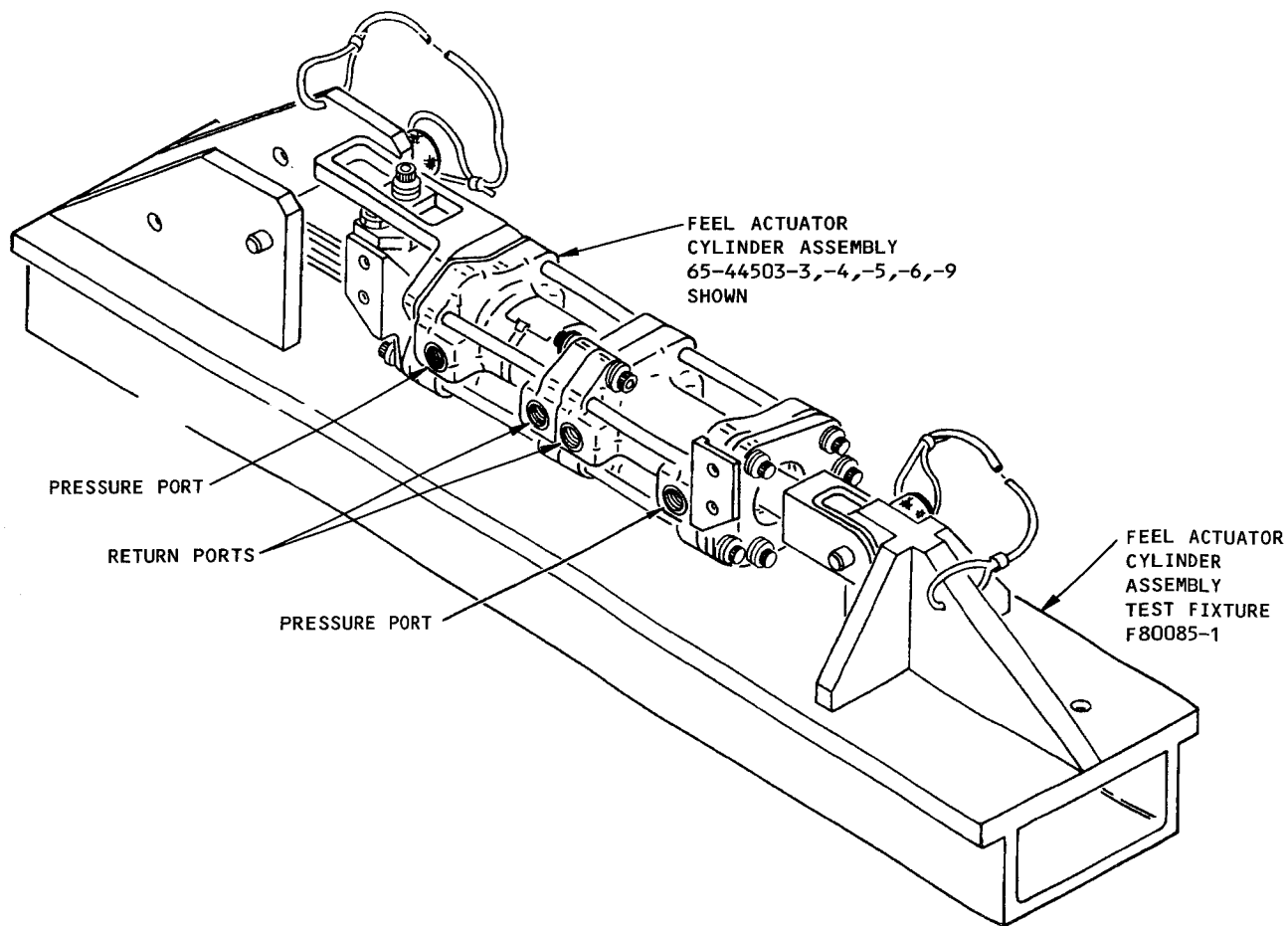
WARNING: DO NOT APPLY COMPRESSED AIR TO PORTS AT ANY TIME.

E. Conduct following tests in the order listed.

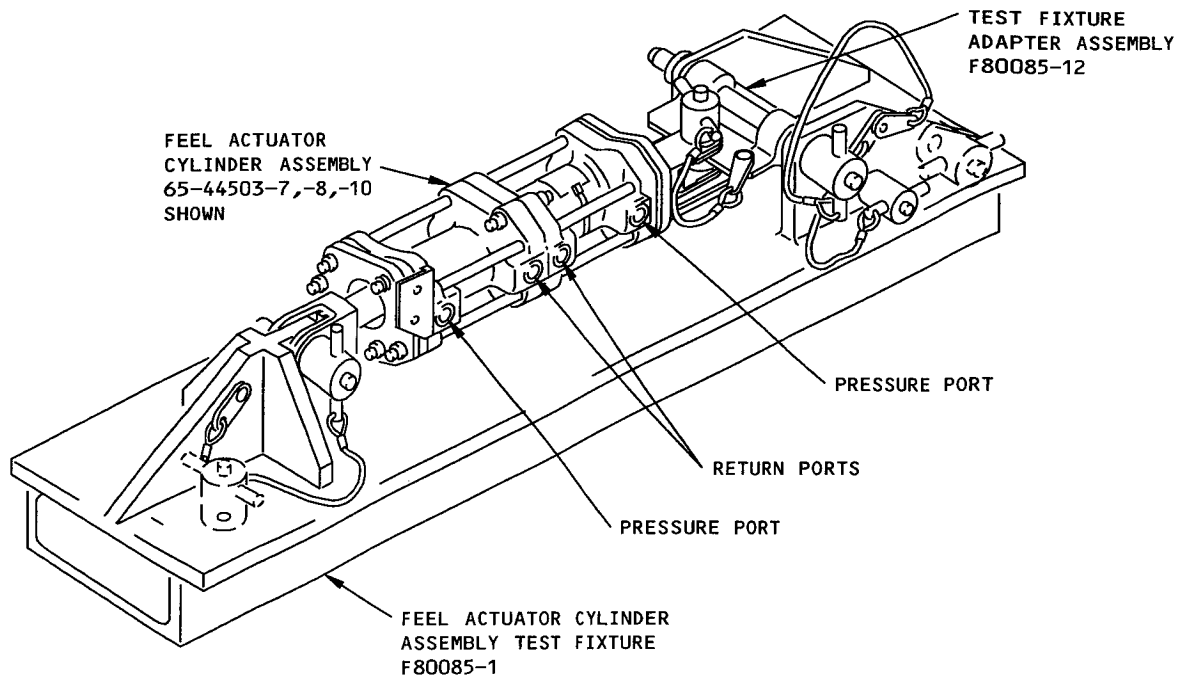
3. Operational Tests

A. External leakage test

- (1) Apply 2100 psi hydraulic pressure from separate sources to both pressure (outer) ports for 1 minute.
- (2) Reduce pressure from one source to 1500 psi while maintaining 2100 psi on other. When body has fully stroked, reverse 1500 and 2100 psi pressures. Continue to alternate pressures for 25 complete cycles.
- (3) Leakage at either piston rod seal shall not exceed one drop in 25 complete cycles of operation.



Functional Test Setup
Figure 702



Functional Test Setup
Figure 703

B. Seal friction tests (unit pressurized)

- (1) Apply equal or nearly equal pressures of 900 psi to both pressure ports with body in approximately center position. Adjust pressures to obtain hydraulic balance so that cylinder body remains stationary.
- (2) Slowly reduce pressure on one port until body starts to move. At this point record pressure gage reading on reduced pressure side.
- (3) Slowly increase pressure on same port until body starts to move in opposite direction. Record pressure gage reading. Total change in recorded pressures shall not exceed 125 psi (112 psi for 65-44503-8, -9, -10 assemblies).
- (4) Repeat at 200 psi equal pressures. Total change in recorded pressures shall not exceed 57 psi (51 psi for 65-44503-8, -9, -10 assemblies).

C. Proof pressure test

WARNING: DO NOT CYCLE UNIT AT PROOF PRESSURE.

- (1) Apply 50 psi pressure to one pressure port with all other ports open to atmosphere. When body has fully stroked, increase pressure to 4500-4600 psi proof pressure at a rate of 25,000 psi per minute maximum. Maintain pressure for 2 minutes.
- (2) Lower pressure to 3-7 psi and hold for two minutes. There shall be no external leakage, failure or permanent set.
- (3) Repeat steps (1) and (2) using other pressure port.
- (4) Apply 50 psi pressure to one return (inner) port with all other ports open to atmosphere. When body has fully stroked, plug pressure port and increase pressure to 2950-3050 return proof pressure at a maximum rate of 25,000 psi per minute. Maintain pressure for 2 minutes.
- (5) Lower pressure to 3-7 psi and hold for two minutes. There shall be no external leakage, failure or permanent set.
- (6) Repeat steps (4) and (5) using other return port.

D. Internal leakage test

- (1) Apply 50 psi pressure to one pressure port with all other ports open to atmosphere. When body has reached fully retracted position, increase pressure to 2100-2150 psi and maintain for 5 minutes. Total leakage from return port of pressurized barrel shall not exceed 10 cc per minute.
- (2) Repeat step (1) using 200-psi pressure. Leakage shall not exceed 20 cc per minute.
- (3) Repeat steps (1) and (2) using other pressure port.

E. Stroke tests

- (1) Unit installed in test fixture.
 - (a) Apply 50 psi to one pressure port with both return ports open to atmosphere, until body has fully stroked.
 - (b) Position device on body for measuring stroke with an accuracy of ± 0.001 inch.
 - (c) Pressurize other pressure port with 100 psi. Record stroke required to bottom body at other end. Check that total stroke is 1.67-1.73 inches.
- (2) Unit free
 - (a) Remove unit from test fixture.
 - (b) Apply 50 psi to both return (inner) ports until both pistons are fully extended.
 - (c) Apply 100 psi to one pressure port while maintaining 50 psi pressure on return ports.
 - (d) Measure total stroke of piston. Stroke shall be 0.03 to 0.12 inch more than recorded stroke in step E.(1)(c).
 - (e) Repeat steps (b), (c), and (d) using other pressure port.
 - (f) Remove hydraulic pressure and manually stroke pistons. There shall be no evidence of sticking or binding.

TROUBLE SHOOTING

<u>Trouble</u>	<u>Possible Cause</u>	<u>Remedy</u>
Leakage at piston rod	Faulty or defective channel seal (48) or packing (49)	Replace parts per Assembly
Leakage at bearing (50)	Faulty or defective packing (46)	Replace parts per Assembly
Leakage between piston rod and clevis assembly (37)	Faulty or defective packings (11)	Replace parts per Assembly
Leakage between barrels (62)	Faulty or defective packing (55)	Replace parts per Assembly
Leakage beyond allowable limit on ports	Faulty or defective seal assembly (40)	Replace parts per Assembly

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STORAGE INSTRUCTIONS

1. Partially fill unit with hydraulic fluid BSM 3-11. If Skydrol 7000 has been used for testing, drain unit thoroughly before partially filling with hydraulic fluid BMS 3-11.
2. Cap or plug ports with hydraulic fluid resistant packings and plugs or caps.
3. Store and protect unit in accordance with standard industry practices and the information contained in 20-44-02.

SPECIAL TOOLS, FIXTURES AND EQUIPMENT

1. Alignment Pin - Feel Actuator Piston -- B27070-1
2. Feel Actuator Cylinder Assembly Test Fixture -- F80085-1
3. Feel Actuator Cylinder Assembly Test Fixture Adapter Assembly -- F80085-12
4. Adapter -- A27035-1

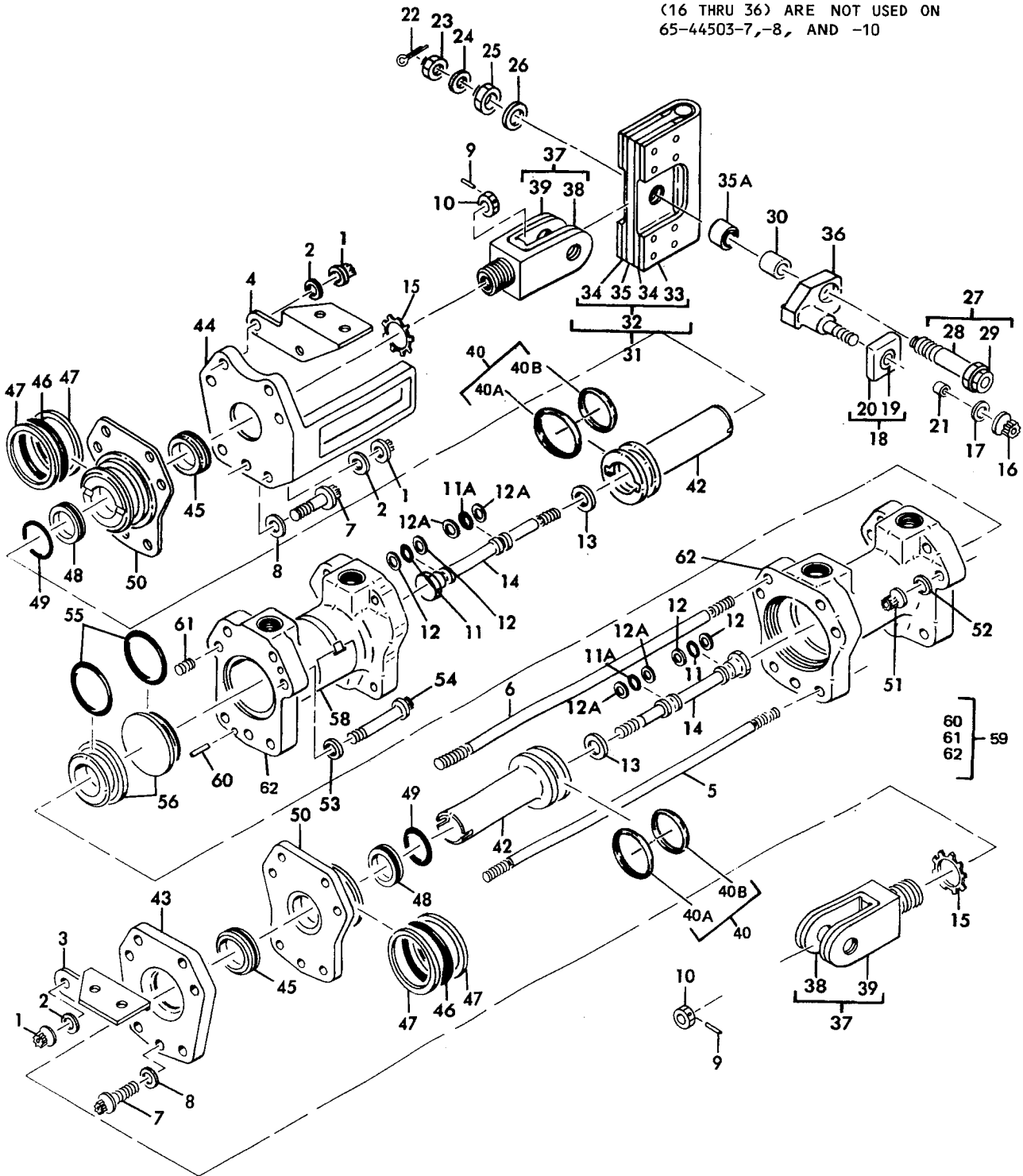
NOTE: Use listed tool or equivalent substitute.

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ILLUSTRATED PARTS LIST

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NOTE: CYLINDERS 65-44503-7,-8, AND -10 ARE IDENTICAL TO 65-44503-5 AND -9 RESPECTIVELY EXCEPT THAT PARTS (16 THRU 36) ARE NOT USED ON 65-44503-7,-8, AND -10



Rudder and Elevator Feel Actuator Cylinder Assembly
Figure 1101

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FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	N O M E N C L A T U R E							USE CODE	QTY PER ASSY
			1	2	3	4	5	6	7		
1101-	65-44503-1		DELETED								
	65-44503-2		DELETED								
	65-44503-3		CYLINDER ASSY, RUDDER & ELEV FEEL ACTUATOR							A	RF
	65-44503-4		CYLINDER ASSY, RUDDER & ELEV FEEL ACTUATOR							B	RF
	65-44503-5		CYLINDER ASSY, RUDDER & ELEV FEEL ACTUATOR							C	RF
	65-44503-6		CYLINDER ASSY, RUDDER & ELEV FEEL ACTUATOR							D	RF
	65-44503-7		CYLINDER ASSY, RUDDER & ELEV FEEL ACTUATOR							E	RF
	65-44503-8		CYLINDER ASSY, RUDDER & ELEV FEEL ACTUATOR							F	RF
	65-44503-9		CYLINDER ASSY, RUDDER & ELEV FEEL ACTUATOR							G	RF
	65-44503-10		CYLINDER ASSY, RUDDER & ELEV FEEL ACTUATOR							H	RF
	65-44503-11		DELETED								
1	BACN10HR4		. NUT (REPLS BACN10CT4)								8
2	AN960PD416L		. WASHER								8
3	69-35924-1		. BRACKET							BD	1
4	69-35924-2		. BRACKET							BD	1
5	66-22816-1		. BOLT, TIE								2
6	66-22816-1		. BOLT, TIE							ACE-H	2
6	66-22816-2		. BOLT, TIE							BD	2
7	BACB30MT4-6		. BOLT							A-G	6
7	BACB30CW4-6		. BOLT (OPT)							A-G	6
7	BACB30US4K16		DELETED								
7	BACB30US4K6		. BOLT							H	6
8	BACW10BN4C		. WASHER (REPLS BACW10AKC4)								6
9	MS16562-191		. PIN, SPRING								2
10	AN315C4R		. NUT								2
11	NAS1611-010		. PACKING, O-RING								2
11A	NAS1611-010		. PACKING, O-RING (USED WITH 69-35676-2, ITEM 42)								2
12	MS28782-5		. RING, BACKUP							A-G	4
12	BACR12BM010		. RING, BACKUP							H	4
12	MS28782-5		. RING, BACKUP (OPT)							H	4
12A	MS28782-5		. RING, BACKUP (USED WITH 69-35676-2, ITEM 42)							A-G	4
12A	BACR12BM010		. RING, BACKUP (USED WITH 69-35676-2)							H	4
12A	MS28782-5		. RING, BACKUP (OPT) (USED WITH 69-35676-2)							H	4
13	AN960C616L		. WASHER								2

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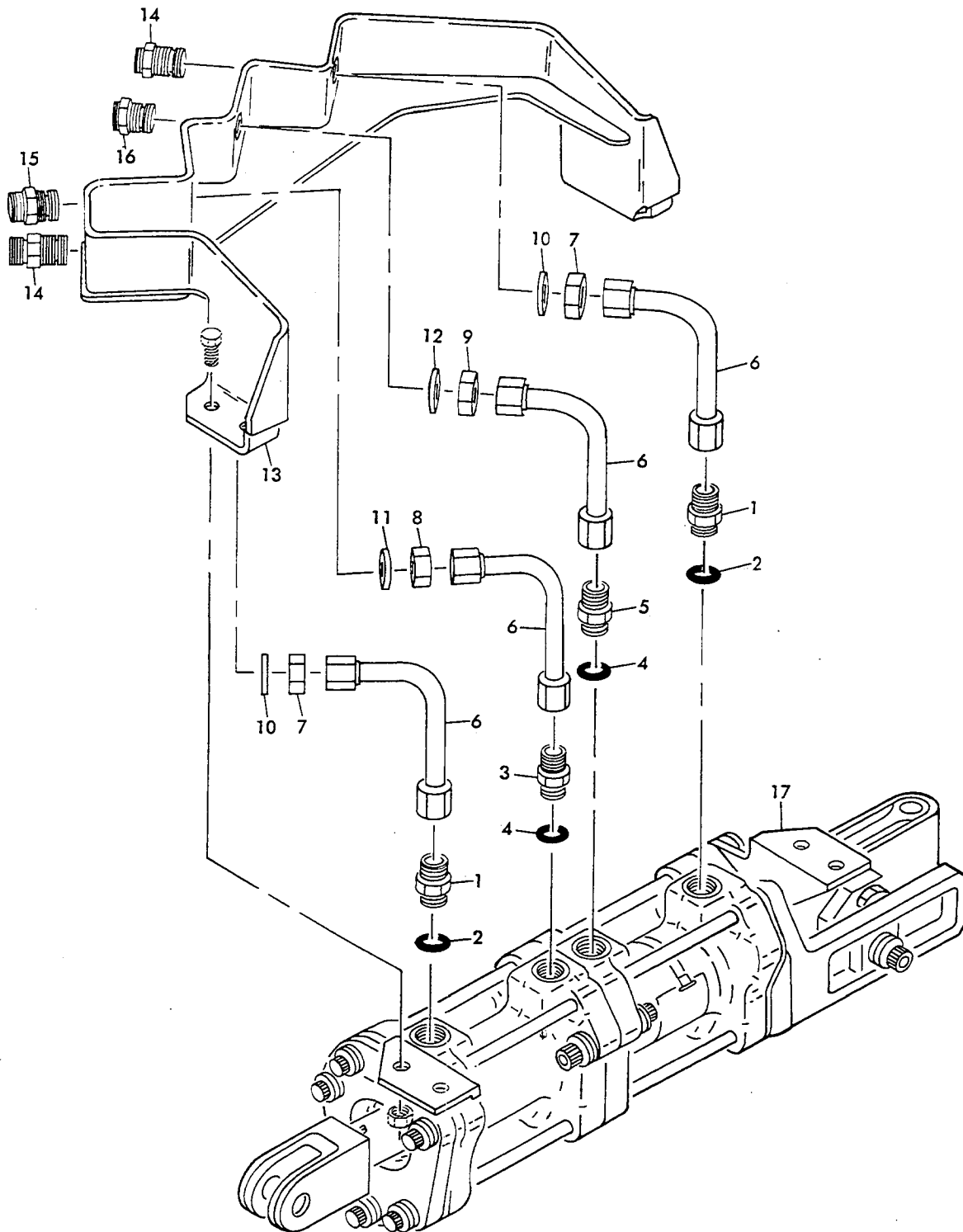
FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	N O M E N C L A T U R E							USE CODE	QTY PER ASSY
			1	2	3	4	5	6	7		
1101-											
14	69-35675-1									2	
15	69-35729-2									2	
15	69-35729-1									DELETED	
15	69-35969-1									2	
16	BACN10HR4								A-DG	1	
17	AN960-416L								A-DG	1	
18	65-38904-2								A-DG	1	
19	65-38904-10									1	
20	65-38904-6									1	
21	66-21297-2									1	
22	MS24665-151								A-D	1	
22	MS17826-4								A-DG	1	
23	MS17826-4								A-DG	1	
24	AN960PD416L								A-DG	1	
25	BACN10HR6								A-D	1	
25	BACN10HR6								G	1	
26	AN960PD616L								A-DG	1	
27	66-22812-1								A-DG	1	
28	66-22810-1									1	
29	BACB30NF4D29									1	
30	NAS75-6-013									1	
31	69-38915-1								A-DG	1	
31	69-38915-4								AB	1	
32	69-38915-2								CDG	1	
33	69-38915-3									1	
34	69-38923-1									2	
35	69-38922-1									1	
35A	BACB28Y8C038									1	
36	66-22811-1									1	
37	66-22815-1								A-DG	2	
38	66-22814-1									1	
39	69-35671-1									1	
40	BACR12BH214A									DELETED	
40	65-44583-1								A-E	2	
40	S33709-214H20								A-E	2	
40	S33709-214H20								FGH	2	
40A	S33709-214-20									1	
40B	S33709-214H									1	
41	NAS1611-214									DELETED	
42	69-35676-3									2	
42	69-35676-2									2	
43	66-22785-1									1	
44	69-35679-1									1	
45	BACS34A5A									2	
45	BACS34A5									2	

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FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE							USE CODE	QTY PER ASSY
			1	2	3	4	5	6	7		
1101-46	NAS1611-218		.	O-RING							2
47	MS28782-23		.	RING, BACKUP							4
48	BACR12BJ116A		.	SEAL, CHANNEL (USED WITH NAS1611-116) (OPT)							2
48	S34572-116H99N		.	SEAL ASSY (V97820) (PREF) (OPT TO BACR12BJ116A)							2
49	NAS1611-116		.	PACKING, O-RING (USED WITH BACR12BJ116A)							2
50	69-35673-2		.	BEARING							2
51	BACN10HR4		.	NUT (REPLS BACN10CT4)							3
52	AN960PD416		.	WASHER					H		3
52	AN960PD416L		.	WASHER					A-G		3
53	BACW10BN4C		.	WASHER (REPLS BACW10AKC4)							3
54	BACB30MT4-16		.	BOLT					A-G		3
54	BACB30CW4-16		.	BOLT (OPT)					A-G		3
54	BACB30US4K6			DELETED							
54	BACB30US4K16		.	BOLT					H		3
55	NAS1611-214		.	PACKING, O-RING							2
56	69-35674-1		.	DAM							2
57	69-35587-1		.	STRAP							1
58	BACN12A3MB		.	NAMEPLATE							1
59	65-44559-1		.	BARREL ASSY (MATCHED SET)							1
60	NAS607-2-4P		.	PIN, DOWEL							2
61	MS21209F4-15		.	INSERT							6
62	65-44559-2		.	BARREL							2



Elevator and Rudder Feel Actuator Assembly
Figure 1102

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FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	N O M E N C L A T U R E							USE CODE	QTY PER ASSY
			1	2	3	4	5	6	7		
1102-	65-45134-3		ELEVATOR FEEL ACTUATOR ASSY							A	RF
	65-45134-31		DELETED								
	65-45134-38		DELETED								
	65-45140-5		RUDDER FEEL ACTUATOR ASSY							B	RF
1	MS21902-4		. UNION								2
2	NAS1612-4		. PACKING, O-RING								2
3	MS21902D6		. UNION							A	1
3	MS21916D6-4		. REDUCER							B	1
4	NAS1612-6		. PACKING, O-RING								2
5	MS21916D6-5		. REDUCER							A	1
5	MS21916D6-4		. REDUCER							B	1
6	69-35935-1		. TUBE ASSY							B	4
7	AN924-4D		. NUT							B	2
8	AN924-6D		. NUT							B	1
9	AN924-5D		. NUT							B	1
10	AN960PD716		. WASHER							B	2
11	AN960PD916		. WASHER							B	1
12	AN960PD816		. WASHER							B	1
13	69-35931-1		. BRACKET ASSY (BRAZED)							B	1
14	MS21924-4		. UNION							B	2
15	BACU24AA0604D		. UNION, REDUCER							B	1
16	BACU24AA0504D		. UNION, REDUCER							B	1
17	65-44503-5		. CYLINDER ASSY, ELEVATOR FEEL ACTUATOR (FIG. 1101)							A	1
17	65-44503-3		. CYLINDER ASSY, ELEVATOR FEEL ACTUATOR (OPT TO 65-44503-5) (FIG. 1101)							A	1
17	65-44503-9		. CYLINDER ASSY, ELEVATOR FEEL ACTUATOR (OPT TO 65-44503-3 or 65-44503-5)(FIG. 1101)							A	1
17	65-44503-11		DELETED								
17	65-44503-6		. CYLINDER ASSY, RUDDER FEEL ACTUATOR (FIG. 1101)							B	1
17	65-44503-4		. CYLINDER ASSY, RUDDER FEEL ACTUATOR (OPT TO 65-44503-6) (FIG. 1101)							B	1

VENDORS

V97820 W. S. SHAMBAN AND CO., P.O. BOX 665, 711 MITCHELL RD., NEWBURY PARK, CALIFORNIA 91320