TO: ALL HOLDERS OF LEADING EDGE FLAP ACTUATOR ASSEMBLY OVERHAUL MANUAL, 27-80-01

REVISION NO. 34, DATED JUL 1/07

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
Changed special tools section to show that F80266-40 supersedes the F80266-30 test fixture										X			
Changed Fig. 401 per latest engineering and increased size of it to improve readability					X								

LEADING EDGE FLAP ACTUATOR ASSEMBLY

27-80-01

BOEING P/N 65-44550-14, -15, -16, -18, -20
65-44551-5, -6, -7, -9

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30387	Aug 15/67
		PRR 30540	Aug 15/67
		PRR 30720	May 15/68
		PRR 31435	Aug 15/69
		PRR 33094	Jul 5/81

LIST OF EFFECTIVE PAGES

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

	PAGE	DATE
	27-80-01	
	T-1	Sep 5/90
	T-2	BLANK
*	LEP-1	Jul 1/07
	LEP-2	BLANK
	T/C-1	Mar 10/71
	T/C-2	BLANK
	1	Jul 5/81
	2	Jun 5/91
	101	Nov 1/00
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	103	Sep 5/92
	104	BLANK
	201	Jul 5/81
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	301	Nov 1/01
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	403	Dec 5/93
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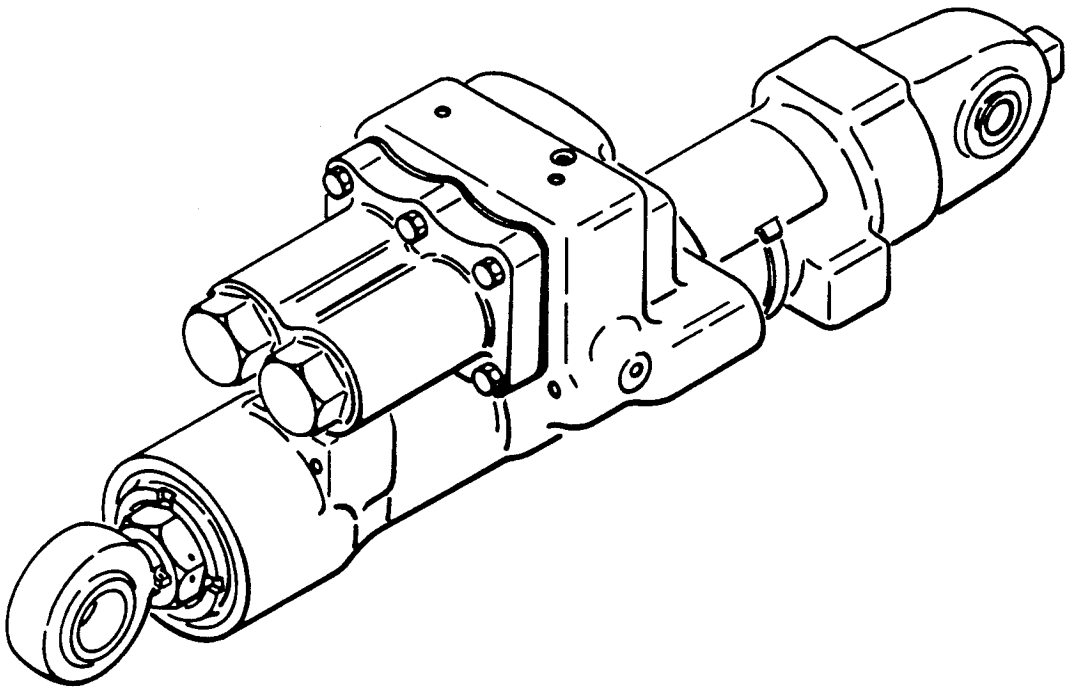


Leading Edge Flap Actuator Assembly
Figure 1

DESCRIPTION AND OPERATION

1. The leading edge flap actuator is a positioning type hydraulic unit. The actuator contains two blocking valves with spring-loaded slides, piston and rod. Bearings on the actuator ends allow pivoting movement of the actuator at the mounting bolts.

2. Three external port connections are provided for the following hydraulic pressure lines:

   A. System A connection for retraction.

   B. System A connection for extension.

   C. Standby system connection for extension.

3. During operation, system A pressure is ported from the airplane 3-position control valve to the retract side of the actuator piston. As the control valve is moved to the extend position, pressure on the extend side of the actuator piston acts upon a larger area than on the retract side, and the piston extends. Closing the control valve causes pressure on the extend side of the piston to port to return, and the greater pressure on the retract side causes piston retraction. When standby pressure is applied, fluid is ported to both sides of the piston, with a greater force exerted on the extend side, causing the piston to extend.

4. Leading Particulars

   A. Operating Medium -- BMS 3-11 hydraulic fluid

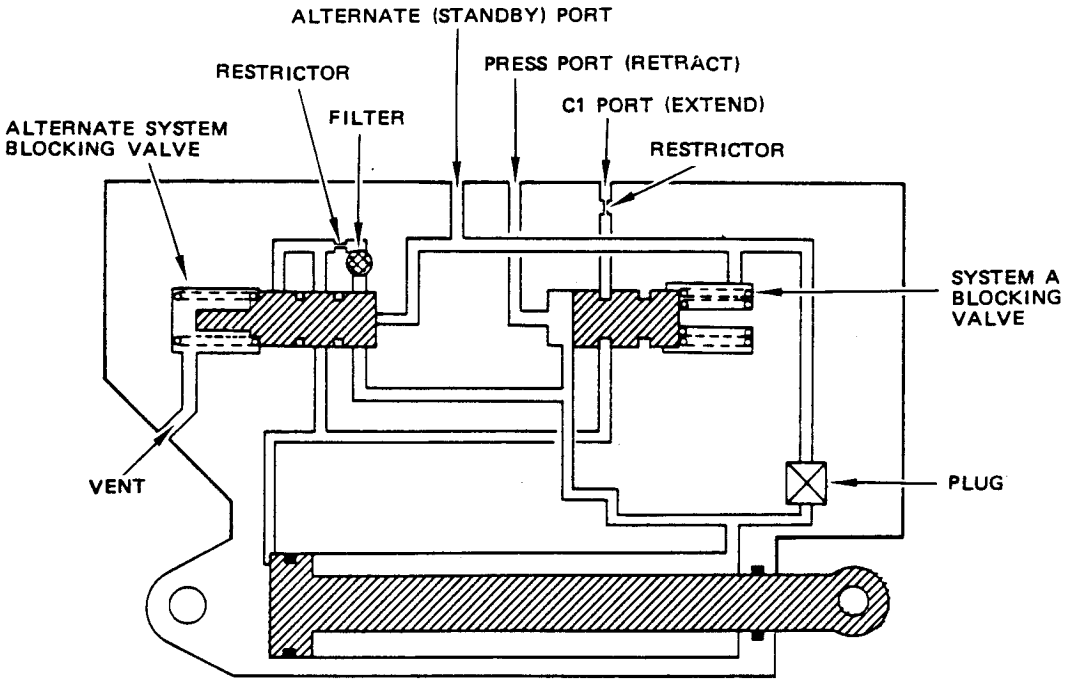
   B. Weight (approximate) -- 11 pounds

   C. Width -- 3.7 inches

   D. Height -- 4.4 inches

   E. Length between bearing centerlines
      Retracted -- 14.9 inches maximum
      Extended -- 22.5 inches minimum

   F. Stroke -- 7.7 inches



Schematic Diagram
Figure 2

DISASSEMBLY

1. General (Fig. 1101).

   A. Remove storage plugs from hydraulic ports. Drain all fluid from actuator.

   B. Cut and remove all lockwire. Strip sealant from rod end and gland nut.

   C. Remove strap (1) and nameplate (2).

   D. (Fig. 1103) if installed, remove parts (1 thru 11) from actuator (15). Do not remove rivets (12) and abrasion shield (13) from bracket (14) unless repair or replacement is necessary.

2. Actuator (Fig. 1101).

   A. Remove screws (3), blocking valve (4) and plate gasket (5). Check for evidence of leakage at gasket and dowel pins.

   B. Secure actuator in a suitable holding device and remove plug (9).

      CAUTION: DO NOT EXERT CLAMPING PRESSURE ON CYLINDER PORTION OF HOUSING OR DISTORTION OF PISTON OR BARREL MAY OCCUR.

   C. Remove retainers (10, 12) and packings (11, 13) from plug (9).

   D. Remove restrictor plug (6), retainers (7), and packing (8).

   E. Loosen nut (15) and unscrew rod end (24) from piston (27). Remove nut (15) and lock (14).

   F. Using wrench XIE 65-44551-1, parts 3 and 4, or adapter F80-0-1552-17, or F80259-4 and vise F42-0-228, or F80264-1 remove gland nut (17). Pull assembled components (16 thru 23, 25 thru 29) from barrel (30). Remove scraper (16), retainer (18), and gland (21). Remove seal (19), packing (20), retainers (22), and packing (23) from gland (21).

   G. Do not remove bearing (26) from rod end (25), and do not remove inserts (31), pins (32), plugs (33) bearing (34), or, if used, steel sleeve from barrel (35) unless replacement is necessary.

3. Blocking Valve (Fig. 1102.)

   CAUTION: DO NOT REMOVE THE SLEEVES (31, 32) FROM THE HOUSING (35) UNLESS REPLACEMENT IS NECESSARY. SLEEVES (31, 32) ARE INSTALLED BY SHRINK FIT METHOD AND CAN NOT BE REMOVED WITHOUT DAMAGE TO THE SLEEVES (31, 32).

   CAUTION: SLIDE (29), SLEEVE (32) AND HOUSING (35) ARE MATCHED SET. MAINTAIN IDENTITY OF THESE PARTS WITH EACH OTHER.

   A. Securely fasten blocking valve in a padded vise and loosen retainer cap (1). Remove cap (1), stop (2), shim (3), springs (4, 5), and slide (29). Measure thickness of shims (3) to facilitate reassembly. Do not remove sleeve (32) unless replacement is necessary.

B. Remove rings (6) and packing (7) from cap (1).

CAUTION: DO NOT REMOVE THE SLEEVES (31, 32) FROM THE HOUSING (35) UNLESS REPLACEMENT IS NECESSARY. SLEEVES (31, 32) ARE INSTALLED BY SHRINK FIT METHOD AND CAN NOT BE REMOVED WITHOUT DAMAGE TO THE SLEEVES (31, 32).

CAUTION: SLIDE (28), SLEEVE (31) AND HOUSING (35) ARE MATCHED SET. MAINTAIN IDENTITY OF THESE PARTS WITH EACH OTHER.

C. Remove retainer cap (8). Remove spring (9), shims (11), and slide (28). Measure thickness of stacked shims (11) to facilitate assembly. Strip ring (12) and packing (13) from slide (28). Do not remove sleeve (31) unless replacement is necessary.

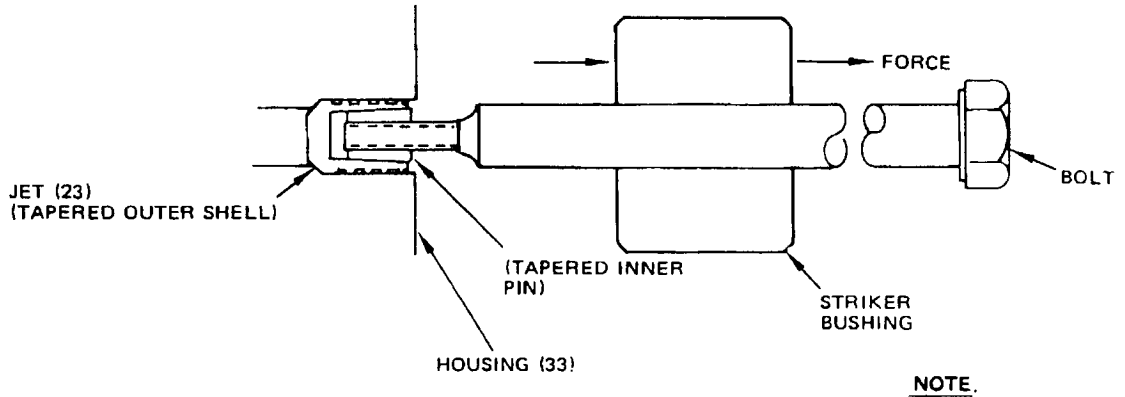
D. Remove plug (14) and strip off ring (15) and packing (16).

E. Do not remove retainer (21), filter screen (22), or jet (23) unless necessary. Reasons for removal would include leakage, to gain access to internal passages as recommended by troubleshooting, or to clean these components.

(1) Remove retainer (21) from housing (20) using a puller for 2-64 UNF-3B thread.

(2) Remove filter screen (22) (if used). Remove jet (23) inner sleeve and outer shell using bolt and striker bushing per Fig. 101.

F. Do not remove rivet (17), washer (18), nameplate (19), pins (24,25,34), or plugs (26) unless replacement is necessary.



Blocking Valve Jet Removal
Figure 101

H14838

4. Equipment

NOTE: Equivalent substitutes may be used.

A. XIE 65-44551-1, parts 3 and 4 -- Wrench

B. F80-0-1552-17 -- Torque Wrench Adapter

C. F42-0-228 -- Special Vise Jaws

D. F80259-4 -- Torque Wrench Adapter (Replaces F80-0-1552-17)

E. F80264-1 -- Vise Jaw Set (Replaces F42-0-228)

CLEANING

1. Clean all parts except bearings (26, 34, Fig. 1101) in accordance with standard industry practices and the information contained in 20-30-03. Clean bearings (26, 34) by special method for teflon lined bearings in 20-30-01.

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. Magnetic particle check per 20-20-01 -- (Fig. 1101) rod end (25), piston and rod (27); (Fig. 1102) stop (2), cap (8), plug (14), slides (28, 29).

3. Penetrant check per 20-20-02 -- (Fig. 1101) plug (9), nut (17), retainer (18), gland (21), (Fig 1102) springs (4, 5, 9), retainer (21).

4. Check springs (4, 5, 9 Fig. 1102) in accordance with Fig. 301. No permanent set shall result from test load.

Index No. Fig. 1102	Approximate Free Length (Inches)	Test Length (Inches)	Load Limits Pounds
4 (69-35944-1)	1.966	1.254-1.264 1.634-1.644	57.67-63.73 26.70-29.50
4 (69-66648-1)	1.938	1.068-1.078 1.634-1.644	74.19-82.01 25.60-28.40
5	1.862	1.150-1.160 1.530-1.540	28.69-31.71 13.27-14.67
9	1.666	1.240 1.570	122.1 - 134.9 27.6 - 30.4

Spring Check Data
Figure 301

CAUTION: DO NOT REMOVE THE SLEEVES (31, 32) FROM THE HOUSING (35) UNLESS REPLACEMENT IS NECESSARY. SLEEVES (31, 32) ARE INSTALLED BY SHRINK FIT METHOD AND CAN NOT BE REMOVED WITHOUT DAMAGE TO THE SLEEVES (31, 32).

5. Housing assembly (30, Fig. 1102):

   A. Check the sleeves (31, 32, Fig. 1102) are tight in housing (30, Fig. 1102).

   B. Do a magnetic check particle (SOPM 20-20-01) of the housing (35, Fig. 1102) with the sleeves (31, 32, Fig. 1102) installed. Make sure to remove all traces of the magnetic particle inspection solution from the passage ways of the housing (35, Fig. 1102)

CAUTION: DO NOT REMOVE THE SLEEVE (36) FROM THE BARREL (35, P/N 65C31198-15, -16, -17) UNLESS REPLACEMENT IS NECESSARY. SLEEVE (36) WAS INSTALLED BY SHRINK FIT METHOD AND CAN NOT BE REMOVED WITHOUT DAMAGE TO THE SLEEVE (36).

6. Barrel (35. Fig. 1101)

   A. Check that sleeve (36, Fig. 1101) is tight in barrel (35, P/N 65C31198-15, -16, -17).

   B. Do a penetrant check (SOPM 20-20-02) of barrel (35, P/N 65-44552-2, -5, 65-44702-2). Make sure to remove all traces of the penetrant inspection solution from the passageways of the barrel.

   C. Do a penetrant check (SOPM 20-20-02) of barrel (35, P/N 65C31198-15, -16, -17) with the sleeve (36, Fig. 1101) installed. Make sure to remove all traces of the penetrant inspection solution from the passageways of the barrel.

7. Check piston (27, Fig. 1101) for alignment. Piston rod diameter must be concentric to large outside diameter within 0.002 inch TIR.

8. Check valve slides (28, 29, Fig. 1102) and sleeves (31, 32, Fig. 1102) without ring, (12, Fig. 1102) and packing (13, Fig. 1102), as matched assemblies.

   A. Lubricate slide and sleeve thoroughly with BMS 3-11 hydraulic fluid at room temperature and assemble.

   B. Turn assembly on end. Slide must move freely under its own weight through sleeve at each of three angular positions spaced approximately 120 degrees apart.

REPAIR

1. Materials

   NOTE: Equivalent substitutes can be used.

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

   B. Corrosion Preventive Compound -- MIL-C-16173 (Ref 20-60-04)

   C. Hydraulic Fluid -- BMS 3-11 (Ref 20-60-03)

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

2. Repair

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

   B. Piston and rod (27, Fig. 1101). (Fig. 401 for repair.)

      (1) Grind piston as required to remove defects to 32 microinch finish per 20-10-01. Do not exceed minimum repair diameter.

      (2) Magnetic particle check per 20-20-01.

      (3) Stress relieve 4340 steel part for 3 hours at 800-850°F if base metal was machined. Optional stress relieve for 4340 steel is 4 hours at 350-400°F. Stress relieve 17-4PH CRES part for 1-4 hours at 850-900°F if base metal was machined (20-10-02).

      (4) Shot peen ground area per 20-10-03 using shot size and intensity shown on repair figure.

      (5) Mask off piston areas that do not require chrome plating.

      (6) Build up piston with chrome plate per 20-42-03, Class 3.

      (7) Bake piston at 375°F plus or minus 25°F for 12 hours minimum.

      (8) Between centers, grind 15° lead-in chamfer on piston rod to clean up chrome.

      (9) Grind piston rod to 1.246/1.247 inch diameter. Polish to an 8 microinch finish and blend edges of lead-in chamfer.

      (10) Passivate per F-17.09.

      (11) Magnetic particle check per 20-20-01.

C. Barrel assembly (30, Fig. 1101)(Fig. 401A) - steel sleeve repair.

NOTE: This method allows repair of barrels which have bare or hard anodized bores, providing wear does not exceed 1.743-1.744 inch repair diameter.

(1) Plug all passages to prevent or minimize contaminant entry into actuator.

(2) Machine bore (diameter -B-) and counterbore (bubble A) to dimensions shown to remove defects. Maintain surface finish of 32 microinches AA or better.

NOTE: Diameter -A- is machined at counterbore location for bubble A only.

(3) Fabricate sleeve 65C31198-14 as shown in Fig. 401B. Use 4330M or AMS 6411 steel or 4130 seamless steel tubing.

(4) Magnetic particle check (SOPM 20-20-01) sleeve after machining.

(5) Clean sleeve (SOPM 20-30-03).

(6) Rubber stamp part number "65C31198-14" (SOPM 20-50-10).

(7) Finish as shown on Fig. 401B.

(8) Hone 1.743-1.744 inch diameter bore to achieve 0.0015-0.0020 inch interference fit to actual sleeve O.D. Keep barrel and sleeve as a matched set.

(9) Thoroughly clean barrel per SOPM 20-30-03 to remove grease, oil, and solid contaminants. Flush all passages to remove chips.

(10) Penetrant check barrel per SOPM 20-20-02.

(11) Alodine reworked surfaces per SOPM 20-43-03, Type II.

(12) Heat barrel to 250°F; cool sleeve to -65°F, then install sleeve in barrel. Check that sleeve has completely and firmly bottomed on internal shoulder of barrel. Allow assembly to stabilize at room temperature.

(13) Hone sleeve to dimension and finish shown. Clean bore per SOPM 20-30-03; dry thoroughly, then oil bore with BMS 3-11 hydraulic fluid.

(14) Vibro engrave new assembly number on barrel assembly; locate approximately as shown.

(15) Tag new assembly as follows: "Repaired barrel assembly 65C31198 is used with oversized seal gland 65C31198-5, packing NAS1611-223, and retainer BACR12BM-223."

D. Barrel assembly (30, Fig. 1101) (Fig. 401A) - Repair for the surface of the barrel assembly that mates with the blocking valve assembly (4).

NOTE: During assembly, a washer may be used with screw (3) to account for material removed during this repair.

(1) Plug all passages to prevent or minimize contaminant entry into actuator.

(2) Machine the surface of the barrel assembly that mates with the blocking valve assembly as necessary to remove corrosion. Do not machine beyond the minimum repair dimension of 1.32 inch as shown in Fig. 401A. The surface finish must be 32 microinch or better. Maintain 0.05 inch fillet radius, and re-establish 90-120° X 0.29-0.33 inch countersink on holes.

(3) Do a penetrant check of the machined area as specified in SOPM 20-20-02.

(4) Chemical treat the machined area as specified in SOPM 20-43-03.

E. Barrel assembly (30, Fig. 1101) -- Repair for the spot removal of corrosion on the valve block face.

(1) Plug all passages to prevent or minimize contaminant entry into actuator.

(2) Locally remove corrosion to a depth of 0.03 with a minimum blend radius of 0.06. No repair within 0.25 inches of the centerline of the five 0.126/0.120 inch diameter fluid holes and the six 0.264/0.257 inch diameter mounting bolt holes.

(3) Penetrant inspect per SOPM 20-20-02.

(4) Apply Alodine 1200 corrosion preventative per SOPM 20-43-03.

(5) Fill the reworked areas with BMS 5-28, Type 1 or 15 compound (optional BMS 5-95 sealant) flush with the mounting surface to avoid water trap and ensure the gasket plate mounts flat on the mounting surface.

(6) Allow compound to cure.

3. Refinish

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

A. Fig. 1101 Parts

(1) Gland nut (17) -- Sulfuric acid anodize (F-2.201) all over. Material: Al alloy.

(2) Seal retainer (18) -- Cadmium plate (F-4.201) on flat surface and OD. Material: Al-Ni-Bronze per AMS 4640.

(3) Seal gland (21) -- Fig. 402.

(4) Rod end (25) -- Passivate (F-8.07) all over. Material: 17-4PH CRES, 170-190 ksi..

(5) Piston and rod (27) -- (Fig. 401.)

(6) Barrel (35) -- Anodize (F-2.202) all areas not hard anodized. Material: Al alloy.

(7) Plug (9) -- Chromic acid anodize (F-2.20) or sulfric acid anodize (F-2.201) all over. Material: Al alloy.

B. Fig. 1102 Parts

(1) Cap (1), stop (2) -- Passivate (F-8.07) all over. Material: 17-4 PH CRES, 170-190 ksi.

(2) Springs (4, 5) -- Nickel plate (F-1.801), 0.0003-0.0005 thick. Material: Elgiloy.

(3) Spring (9) -- Cadmium plate (F-1.1923) all over. Material: 9254 Chrome-Silicon wire, QQ-W-412.

(4) Plug (14), retainer (21) -- Passivate (F-8.07) all over. Material: 17-4 PH CRES.

(5) Slide (28), sleeve (31) -- Passivate (F-8.07 or F-17.09). Material: 440C CRES.

(6) Housing (35) -- Passivate (F-8.07 or F-17.09) all over. Material: 17-4 PH or 15-5PH CRES, 170-190 ksi.

C. Bracket (14, Fig. 1103) -- Alodize or chromic acid anodize and apply primer BMS 10-11, Type 1 (SRF-2.30) all over. Material: Al alloy.

4. Replacement

A. Replace O-ring packings and backup rings.

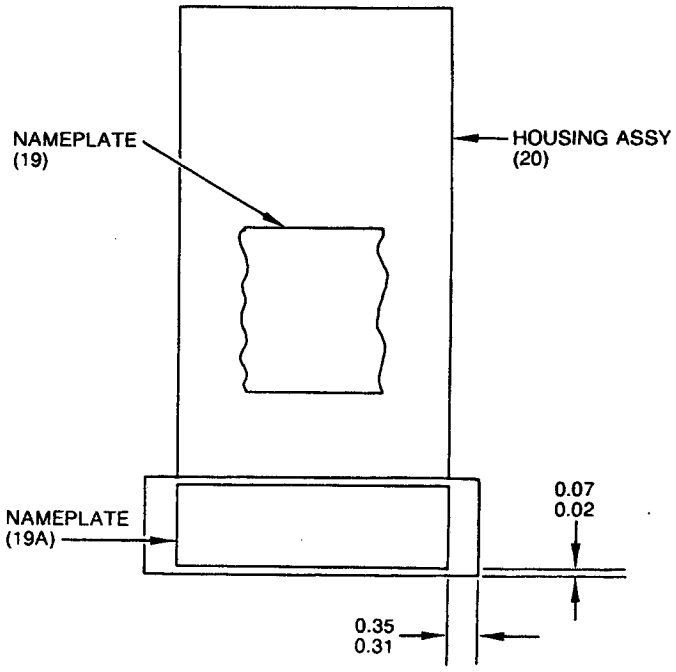
B. Bearings (26, 34, Fig. 1101) -- Install new bearings per 20-50-03.

C. Inserts (31, Fig. 1101) -- Install new inserts with wet BMS 10-11, Type 1 primer 3/4 to 1-1/2 turns below countersink. Remove tang.

D. Pins (32, Fig. 1101; 25, Fig. 1102), plugs (33, Fig. 1101; 26, Fig. 1102) -- Replace per 20-50-04.

E. Nameplate

(1) (2, Fig. 1101; 19, Fig. 1102) -- Steel stamp the serial and assembly numbers on the new nameplate before installation.



Nameplate Replacement
Figure 400

(2) (19A, Fig. 1102)

(a) Remove the damaged nameplate.

(b) Clean the surface. Refer to 20-30-03.

(c) Install the new nameplate in the location shown (Fig. 400). Bend the nameplate as necessary to conform to the contour of the valve.

(d) Bond the nameplate to the valve using type 70 adhesive. Refer to 20-50-12.

(e) Apply a fillet seal around the periphery of the nameplate. Use type 70 adhesive.

F. Pins (24, 34, Fig. 1102) -- Install new pins so they protrude 0.210 - 0.215 inch. (24) and 0.06 inch (34).

G. Blocking valve sleeve (31, 32, Fig. 1102)

(1) Remove sleeves (31, 32).

(2) Clean cavity in housing (35) and check for defects.

(3) Hone OD of new sleeve for interference fit of 0.0004 - 0.0008 inch with housing (35).

(4) Bake housing in oven (35) at 450 - 500°F for 1 hour.

(5) Install sleeves (31, 32) in housing (35). Allow to cool slowly to room temperature.

(6) Hone ID of sleeve (32) until slide (29) is a tight sliding fit in sleeve (32).

(7) Lap mating surfaces of slide (29) and sleeve (32) to a surface finish of 4 microinches or better with clearance which will keep leakage within limits per TESTING.

(8) Test slide and sleeve fit per INSPECTION/CHECK, par. 8.

(9) Fit slide (28) into sleeve (31) in accordance with steps (6), (7), (8) preceding.

(10) Electro-etch or vibro-engrave serial numbers on each set per 20-50-10 and Fig. 403.

CAUTION: EACH OF THESE SETS ARE PRECISION MATCHED. PARTS MUST BE KEPT TOGETHER TO MAINTAIN PROPER FIT.

H. Bracket (11, Fig. 1103).

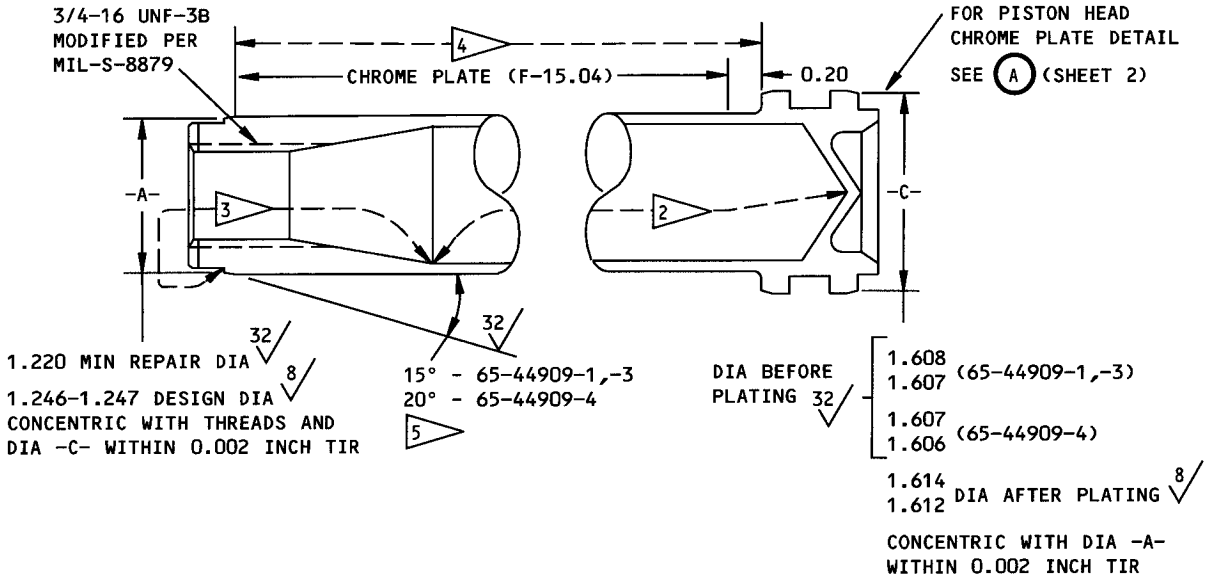
(1) Remove rivets (12) and abrasion shield (13) from bracket (14).

NOTE: Methyl ethyl ketone may be used to soften adhesive.

(2) Bond abrasion shield (13) to bracket (14) per 20-50-12, type 38.

(3) Install rivets (12) with heads countersunk in abrasion shield (13).

I. Tubes (1, 2, 3, Fig. 1103) — Replace tape on tube (1, 2, and 3, Fig. 1103). Note direction of arrows prior to scraping off old tape. Clean tube surface thoroughly before applying new tape. See Fig. 704 for tube marking details.



REFINISH

PASSIVATE (F-17.09) ALL OVER. CHROME PLATE (F-15.04) ROD AND PISTON OD (0.003-0.005 THICK) AS SHOWN. APPLY PHOSPHATE COATING CORROSION PREVENTIVE COMPOUND, AND CADMIUM PLATE PER 2 3

1. IF THE ROD WAS NOT CHROME PLATED DURING MANUFACTURE, GRIND TO THE DIAMETER AND THE RELIEF RADIUS AS SHOWN. RESTORE SURFACE PER REPAIR PAR 2.B.
2. PHOSPHATE COAT (F-18.02) AND APPLY CORROSION PREVENTIVE COMPOUND, MIL-C-16173 GRADE 3 THIS AREA (OPTIONAL: CADMIUM PLATE (F-1.32) THIS AREA)
3. CADMIUM PLATE (F-1.32) THIS AREA
4. SHOT PEEN THIS SURFACE ONLY (REFER TO 20-10-03)
5. MAKE SURE THAT CHAMFER EDGES ARE BLENDED SMOOTH TO PREVENT DAMAGE TO FOOT SEAL WHEN INSTALLED.

REPAIR

SHOT SIZE: 230 MIN

INTENSITY: 0.005A-0.007A

COVERAGE: 2.0

MATERIAL:
(65-44909-1,-3) 17-4 PH, 170-190 KSI
(65-44909-4) 4340 STEEL, 180-200 KSI

ALL DIMENSIONS ARE IN INCHES

6. 0.020 R BEFORE PLATING AND 0.005-0.010 R AFTER PLATING.
7. CHROME PLATE FROM RADIUS TANGENT POINT TO RADIUS TANGENT POINT AS SHOWN.
8. NO CHROME PLATING INSIDE THIS DIAMETER. ANGLE STARTS AT THIS LINE.
9. LENGTH OF 0.104-0.084 R CORNER RADIUS.

Piston and Rod Repair and Refinish
Figure 401 (Sheet 1)

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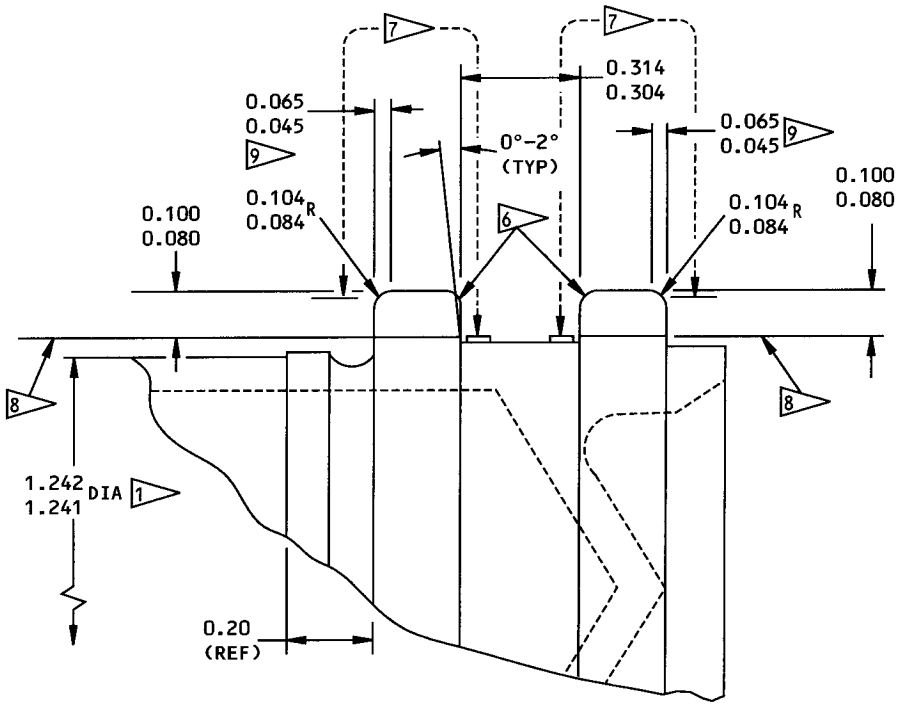

65-44909-1,-3 SHOWN 1
65-44909-4 SIMILAR

A

Piston and Rod Repair and Refinish
Figure 401 (Sheet 2)

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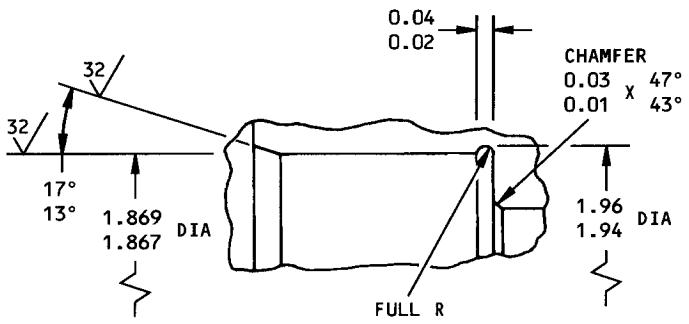
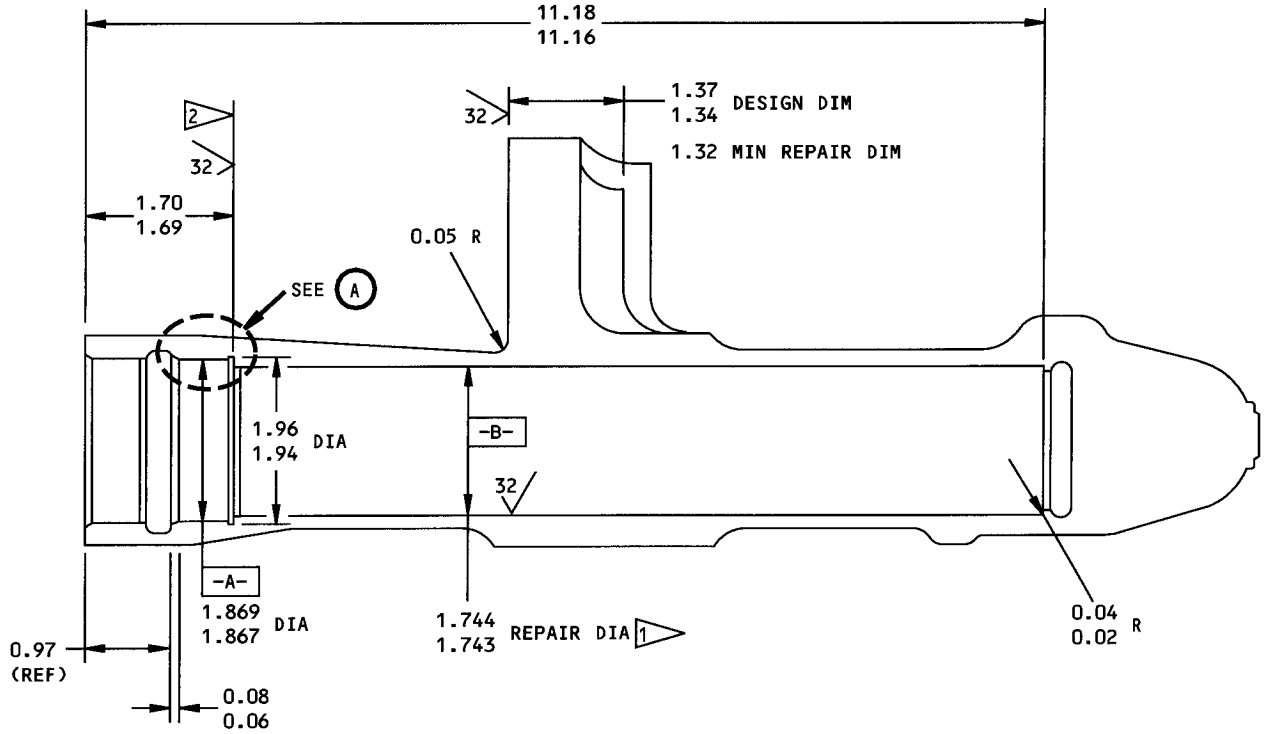
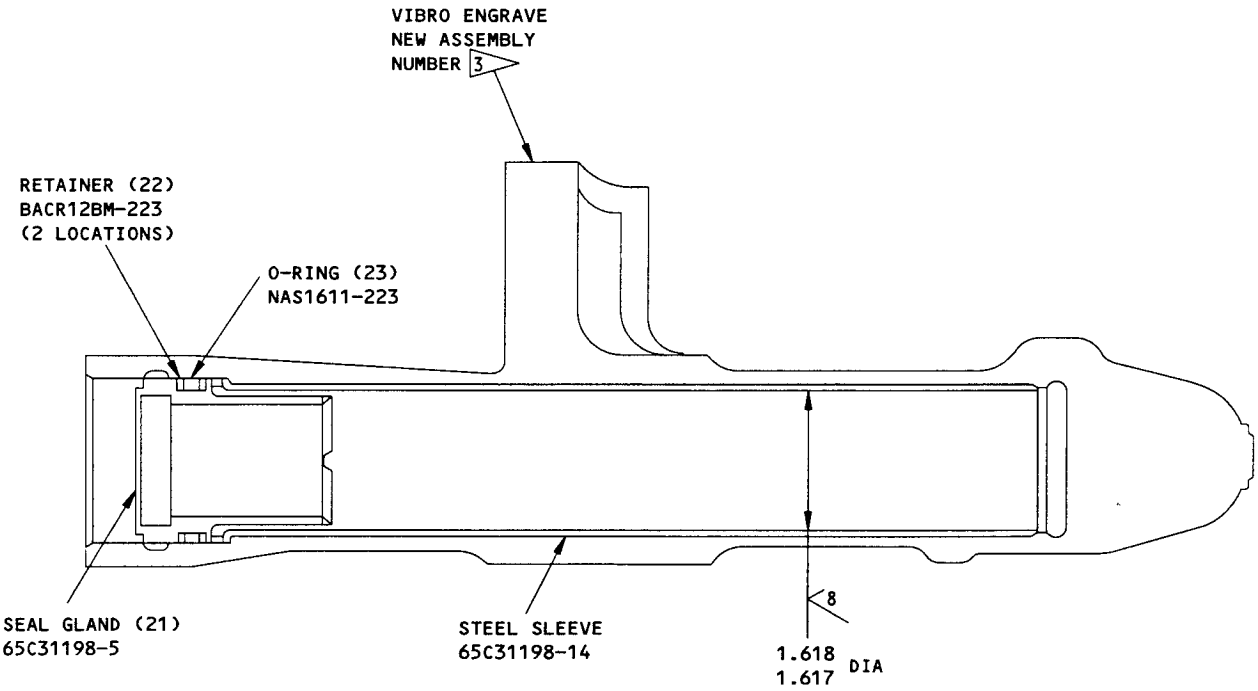




BARREL 65C31198-15,-16,-17

Barrel Repair and Refinish
Figure 401A (Sheet 1)

K26668



BARREL ASSEMBLY 65C31198-11,-12,-13

REFINISH

BARREL: HARD ANODIZE (F-2.204) EXTERIOR SURFACES ONLY

1 TOTAL RUNOUT WITH RESPECT TO -A- TO BE WITHIN 0.001.

2 PERPENDICULAR TO -B- WITHIN 0.0010.

3 65C31198-11 FROM 65-44552-1
65C31198-12 FROM 65-44552-4
65C31198-13 FROM 65-44702-1

REPAIR

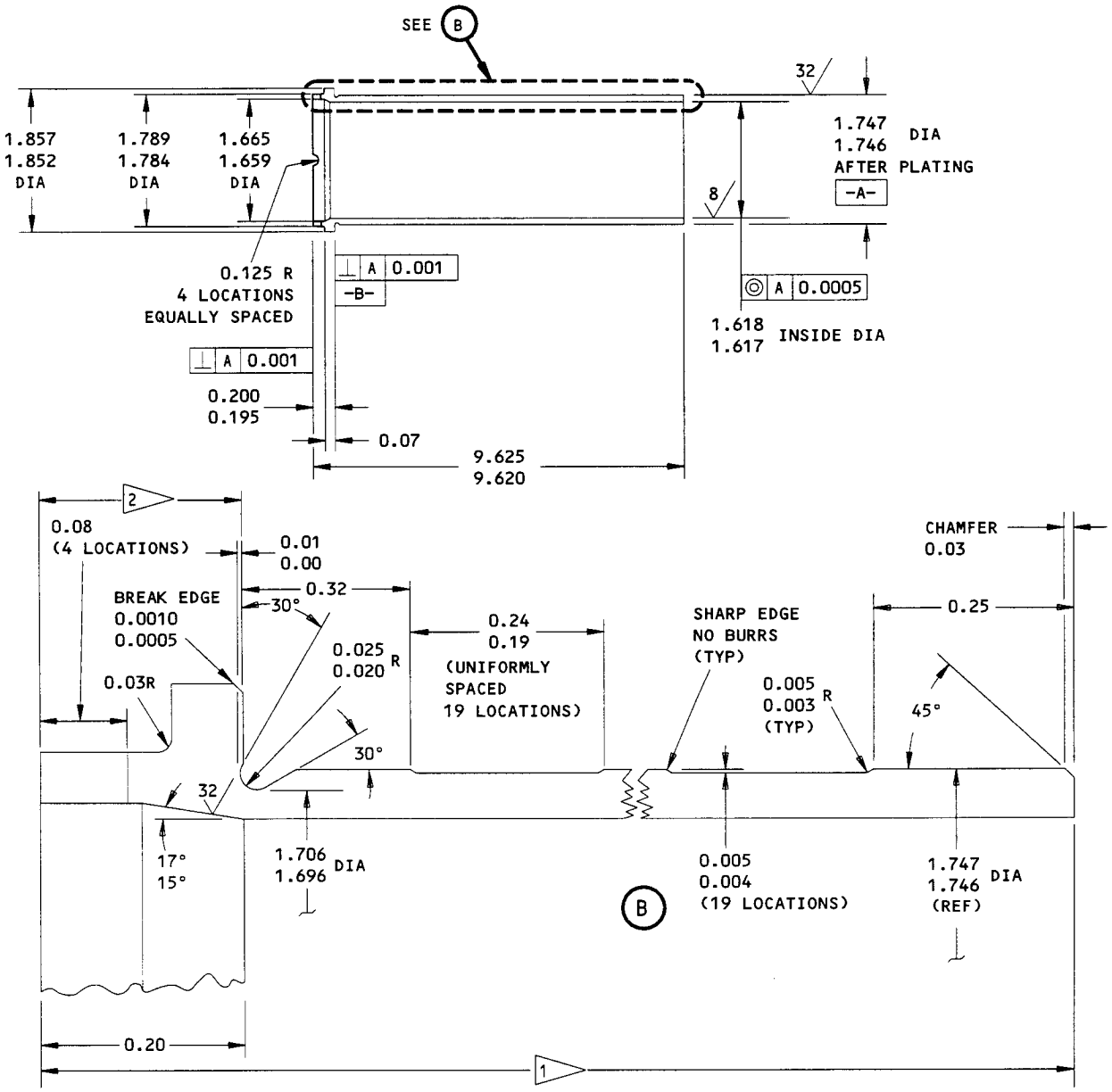
REF 1 2 3

MATERIAL
SLEEVE: 4330M STEEL, 4130 SEAMLESS STEEL TUBING OR AMS 6411, 150-170 KSI

BARREL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

Barrel Repair and Refinish
Figure 401A (Sheet 2)



FINISH

CLEAN SLEEVE BEFORE CAD PLATING (REF 20-30-03)

CADMIUM PLATE (F-15.25), EXCEPT 0.0002-0.0003 THICK, AND COAT WITH PRESERVATIVE OIL ALL OVER EXCEPT WHERE NOTED BY 1 2.

1 OMIT CAD PLATING ON INSIDE DIAMETER

2 OMIT CAD PLATING ON OUTSIDE DIAMETER AS SHOWN

REPAIR

MATERIAL: 4330M STEEL, 4130 SEAMLESS STEEL TUBING, OR AMS 6411, 150-170 KSI

TOLERANCES: DECIMALS ± 0.01, ANGLES ± 2°

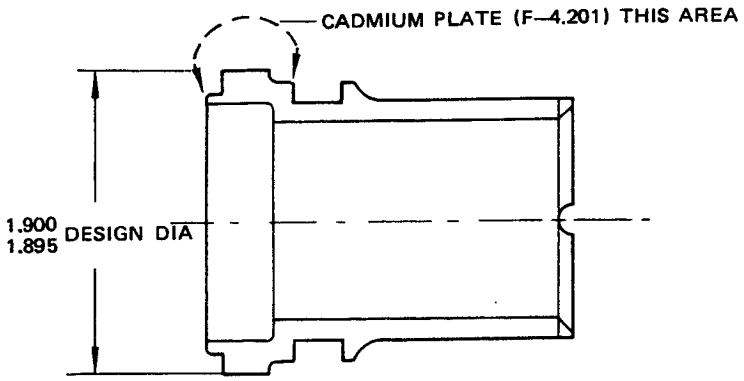
FINISH: 125 MICROINCHES UNLESS OTHERWISE NOTED

ALL DIMENSIONS ARE IN INCHES

65C31198-14
STEEL SLEEVE FABRICATION

Manifold Bore Repair
Figure 401B

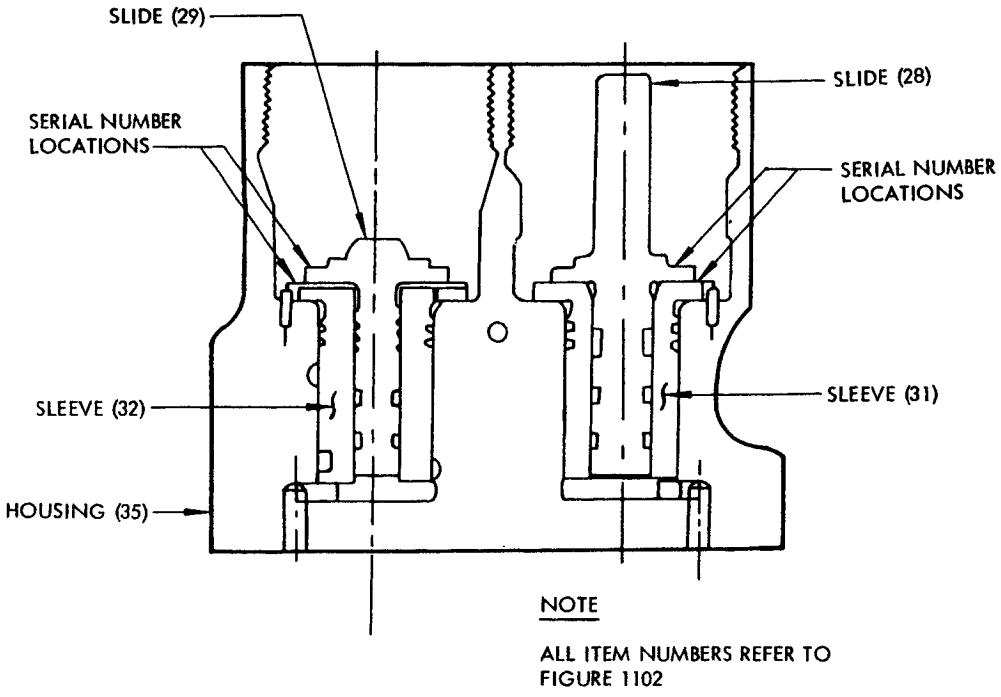
C92519



MATERIAL: AL-NI-BRONZE PER AMS 4640

GLAND (21, FIG. 1101)

Gland Refinish Details
Figure 402



Blocking Valve Slide and Sleeve Serial Number Locations
Figure 403

ASSEMBLY

1. Prior to assembly, lubricate all O-rings, packings, and backup rings with hydraulic fluid, BMS 3-11 and install wet, or lightly lubricate with assembly lube.

2. Blocking Valve (Fig 1102.)

   A. Install jet (23) outer shell in housing (33). Press jet (23) inner sleeve into outer shell and seat flush with shell per 20-50-04. Install filter (22) (if used) and retainer (21). Press retainer (21) in until filter screen (22) is firmly sealed.

   B. Install packing (16) and backup ring (15) on plug (14). Insert plug into housing (33) and tighten plug.

   C. Install backup ring (12) and packing (13) onto slide (28). Use care to prevent scoring of packing as it passes over edge of slides.

   D. Carefully fit mated slide (28) into sleeve (31).

      CAUTION: SLIDE (28) SLEEVE (31) ARE MATCHED SETS. AND MUST BE KEPT TOGETHER.

   E. Install shim (11) with thickness as measured in disassembly.

      NOTE: Shim thickness will be adjusted during functional test (Ref TESTING).

   F. Install spring (9) and retainer cap (8). Tighten cap to 150-180 lb-in.

   G. Carefully fit mated slide (29) into sleeve (32).

      CAUTION: SLIDE (29), SLEEVE (32), AND HOUSING (33) ARE MATCHED SET AND MUST BE KEPT TOGETHER.

   H. Install springs (5 and 4).

   I. Install shim (3) with thickness as measured in disassembly.

      NOTE: Shim thickness is adjusted during functional test (Ref TESTING).

   J. Insert stop (2) over shim (3).

   K. Place backup rings (6) and packing (7) onto retainer cap (1). Install cap (1) and tighten to 150-180 lb-in.

3. Actuator (Fig. 1101).

CAUTION: DO NOT EXERT CLAMPING PRESSURE ON CYLINDER PORTION OF HOUSING OR DISTORTION OF PISTON BARREL MAY OCCUR.

A. Install cap ring (28) and packing (29) on piston (27) per 20-50-06. Insert piston and rod (27) into barrel (30).

B. Place retainers (22) and packing (23) onto OD of gland (21). Install packing (20), foot seal (19) and retainer (18) into ID of gland (21). Press gland over piston and into barrel until gland is firmly seated.

C. Install scraper (16) into gland nut (17). Thread gland nut (17) into barrel (35) to engage approximately two threads. Apply a light coating of grease to the exposed threads. Using wrench XIE 65-44551-1 parts 3 and 4, or adapter F80-0-1552-17, or F80259-4 and vise F42-0-228, or F80264-1 tighten nut (17) to 750-800 lb-in.

D. Install lock (14) and nut (15) onto rod end assembly (24). Thread rod end (24) into piston (27) to engage approximately two threads. Apply a light coating of grease to the exposed threads. With piston (27) fully retracted, screw rod end into piston until the approximate length of 14.89 inches between bearing center lines is obtained. Tighten nut (15) securely.

NOTE: Rod end is adjusted during functional test to obtain specified distance (Ref TESTING). Nut (15) is tightened to final torque after final setting.

E. Place retainers (10) and packing (11) on end of plug (9). Carefully work retainers (12) and packing (13) over threaded portion of plug (9) and insert in place. Install plug into barrel assembly (30) and tighten to 190-225 lb-in.

F. Place retainers (7) and packing (8) onto restrictor plug (6). Lubricate plug (6) with assembly lube and install plug into barrel (30). Tighten plug to 110-130 lb-in.

G. Install gasket plate (5) and blocking valve (4), sealing holes in gasket plate per Fig. 502. Insert screws (3) and tighten to 60-75 lb-in.

H. If a new nameplate (2) and strap (1) are being installed, form both items to proper contour of barrel (35). Fix strap (1) through slots on nameplate (2), and bend strap ends back to ensure a firm fit.

I. Perform functional test (Ref TESTING).

J. Install lockwire to secure nut (17) to barrel, nut (15) to lock (14), and screws (3) on blocking valve. Secure lockwire with seal.

K. Wipe off excess grease. Clean contact area between gland nut (17) and barrel (35) and area between rod end (24) and piston (27) with solvent.

L. Apply BMS 5-26 sealant to areas shown in Fig. 501. Sealant must seal off all moisture access to gland nut (17) threads and rod end (24) threads all around circumference. Allow sealant to cure. Check that sealant has bonded to surfaces.

4. Materials and Equipment

NOTE: Equivalent substitutes may be used.

A. Hydraulic Fluid -- BMS 3-11 (Ref 20-60-02)

B. Assembly Lube -- MCS 352 (Ref 20-60-02)

C. Sealant -- RTV 174 (Replaces Dow Corning 30-121) (Ref 20-60-04)

D. Grease -- BATCO 8401 No. 1 (No. 2 Optional)

E. Sealant - BMS 5-26 Type II Class B-1/2, Optional Class B-2 (Ref 20-60-04)

F. Solvent -- Methyl Ethyl Ketone (TT-M-261) (Ref 20-60-01)

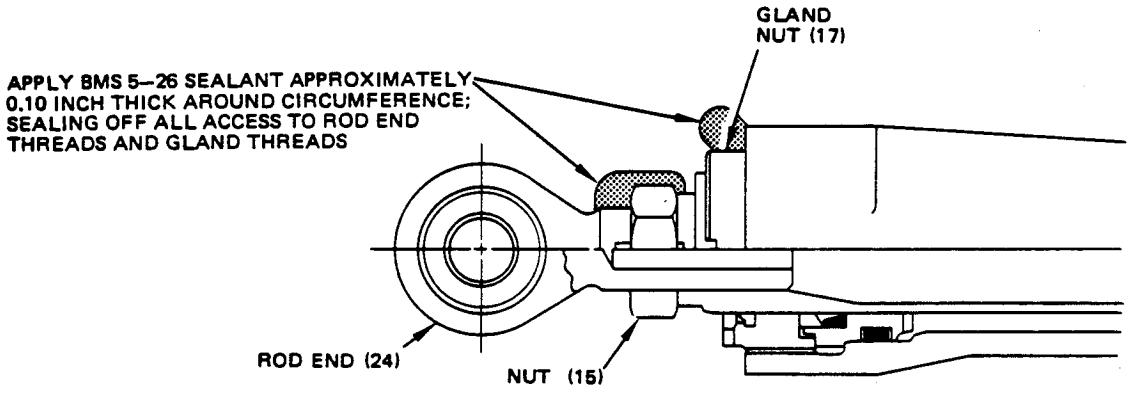
G. XIE 65-44551-1, parts 3 and 4 -- Wrench

H. F80-0-1552-17 -- Torque Wrench Adapter

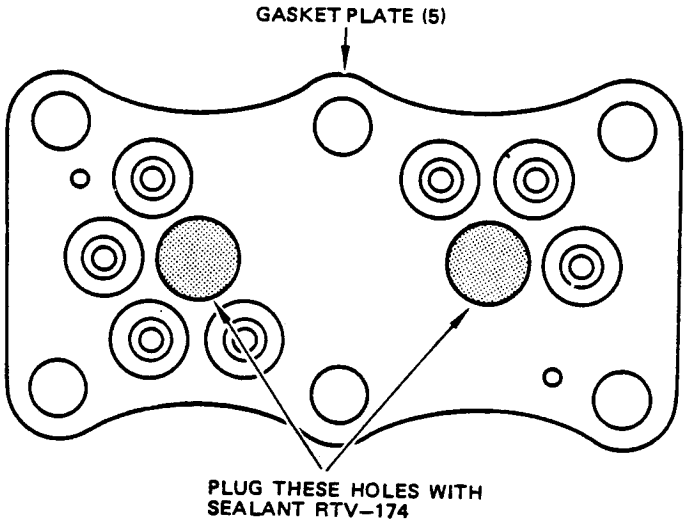
I. F42-0-228 -- Special Vise Jaws

J. F80259-4 -- Torque Wrench Adapter (Replaces F80-0-1552-17)

K. F80264-1 -- Vise Jaw Set (Replaces F42-0-220)

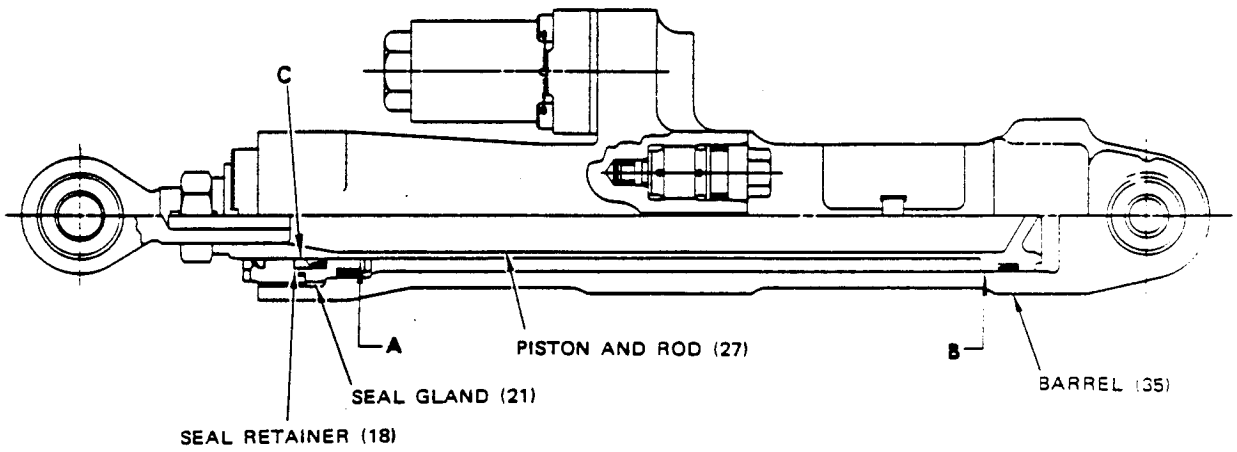


Sealant Application
Figure 501



Gasket Sealing
Figure 502

FITS AND CLEARANCES



Ref Letter Fig.601	Mating Item No. Fig. 1101	Design Dimensions				Service Wear Limits		
		Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inches)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
A	ID 21	1.2490	1.2510	0.0020	0.0050		1.2540	0.0070
	OD 27	1.2460	1.2470			1.2440		
B	ID 35	1.6170	1.6180	0.0030	0.0060		1.6190	0.0080
	OD 27	1.6120	1.6140			1.6100		
C	ID 18	1.2490	1.2500	0.0020	0.0040		1.2530	0.0060
	OD 27	1.2460	1.2470			1.2440		

Fits and Clearances
Figure 601

TESTING

1. Test Equipment

NOTE: Equivalent substitutes may be used.

A. Hydraulic test stand providing fluid flow of one gpm minimum at 70 to 120° F, and capable of controlled pressure from zero to 5450 psi. Test fluid shall be BMS 3-11 (Skydrol 7000 optional)

NOTE: If Skydrol 7000 is used, leakage limits are 80% of stated values.

B. Three calibrated hydraulic pressure gages with zero to 5400 psi range

C. Test fixture, Ling-Temco-Vought P/N L401-07836 or equivalent (Fig. 701) (Superseded by Parker Hannifin F65-0-2338)

D. Suitable valves, fittings, and hoses

E. Test fixture, Parker Hannifin F65-0-2338 (Replaced by F80266-30)

F. Test manifold, Parker Hannifin F65-0-2190

G. Test gage, Parker Hannifin F67-0-1163

H. F80265-1 Test manifold (Replaces F65-0-2190)

I. F80261-1 Test gage (Replaces F67-0-1163)

J. F80266-30 Test fixture (Superseded by F802660-40) (Supersedes F80266-1) (Replaces F65-0-2338)

K. F80266-40 (Supersedes F80266-30)

2. Blocking Valve Assembly Pretest (Fig. 1102)

NOTE: The equivalent of this test may be performed in accordance with functional test par. 4.

A. Preparation for Test

(1) Install blocking valve assembly with gasket plate (5, Fig. 1101) on a suitable test fixture with connections to the blocking valve assembly ports as shown in Fig. 703.

B. Perform system "A" proof pressure test.

(1) Close C1 pressure-out, C2 pressure-out, system "A" pressure-out, and ALT system pressure-in ports.

(2) Apply 5350 to 5450 psi fluid pressure to C1 pressure-in, C2 pressure-in and system "A" pressure-in ports. Hold for 3 minutes.

(3) Reduce the pressure to 1 to 5 psi and hold for 2 minutes.

(4) Apply 5350 to 5450 psi again and hold for 5 minutes. There must be no external leakage, permanent deformation or damage as a result of these tests.

C. Perform alternate system proof pressure test.

(1) Close system "A" pressure-in, C1 pressure-in, C1 pressure-out, C2 pressure-out and system "A" pressure-out ports. Orient assembly with standby spring vent hole downward, to aid leak detection.

(2) Apply 5350 to 5450 psi fluid pressure to ALT system pressure-in port. Hold for 5 minutes.

(3) Reduce pressure to 1 to 5 psi and hold for 2 minutes.

(4) Apply 5350 to 5450 psi again and hold for 5 minutes. Check that there is no external leakage, permanent deformation or damage.

D. Perform system "A" cracking pressure test.

(1) Vent system "A" pressure-out port into a suitable container and apply 40 to 50 psi fluid pressure to ALT system pressure-in port.

(2) Apply gradually increasing fluid pressure to system "A" pressure-in port until flow begins at system "A" pressure-out port. Check that pressure at which flow begins is 1900 to 2200 psi.

(3) Check reset pressure by increasing applied pressure to 2950 to 3050 psi. Gradually decrease pressure until flow from system "A" pressure-out port stops. Check that applied pressure at which flow stops is minimum of 1650 psi.

E. Perform system "A" leakage test.

(1) Close C1 pressure-out , C2 pressure-out and system "A" pressure-out ports and open C1 pressure-in, C2 pressure-in and system "A" pressure-in ports.

(2) Apply 950 to 1050 psi fluid pressure to ALT system pressure-in port and hold for 1 minute. Check that total leakage from C1 pressure-in, C2 pressure-in and system "A" pressure -in ports does not exceed 1.0 cubic centimeter per minute.

F. Perform system "A" flow rate test.

(1) Vent system "A" pressure-out port into a suitable container and close C1 pressure-out and C2 pressure-out ports.

(2) Apply 2950 to 3050 psi fluid pressure simultaneously to system "A" pressure-in, C1 pressure-in and C2 pressure-in ports.

(3) Measure rate of flow from system "A" pressure-out port.

(4) Repeat steps (1), (2), (3), venting C1 pressure-out port and C2 pressure-out port in turn. Check that rate of flow from each vented port is 1.70 cubic inch per second or more.

G. Perform alternate system cracking pressure test.

(1) Close C1 pressure-out and C2 pressure-out ports and vent system A pressure-out port into a suitable container.

(2) Apply gradually increasing fluid pressure to ALT system pressure-in port until flow begins at system A pressure-out port. Check that pressure at which flow begins is 1400 to 1700 psi.

(3) Check reset pressure by raising applied pressure to 2950 to 3050 psi. Gradually reduce pressure until flow from system A pressure-out port ceases. Check that applied pressure at which flow stops is minimum of 1100 psi.

H. Perform alternate system leakage test.

(1) Close C1 pressure-out, C2 pressure-out and system A pressure-out ports and open ALT system pressure-in port.

(2) Apply 950 to 1050 psi fluid pressure simultaneously to C1 pressure-in, C2 pressure-in and system A pressure-in ports. Hold for 1 minute and check that leakage at ALT system pressure in port does not exceed 3.0 cc per minute.

I. Perform alternate system flow rate test.

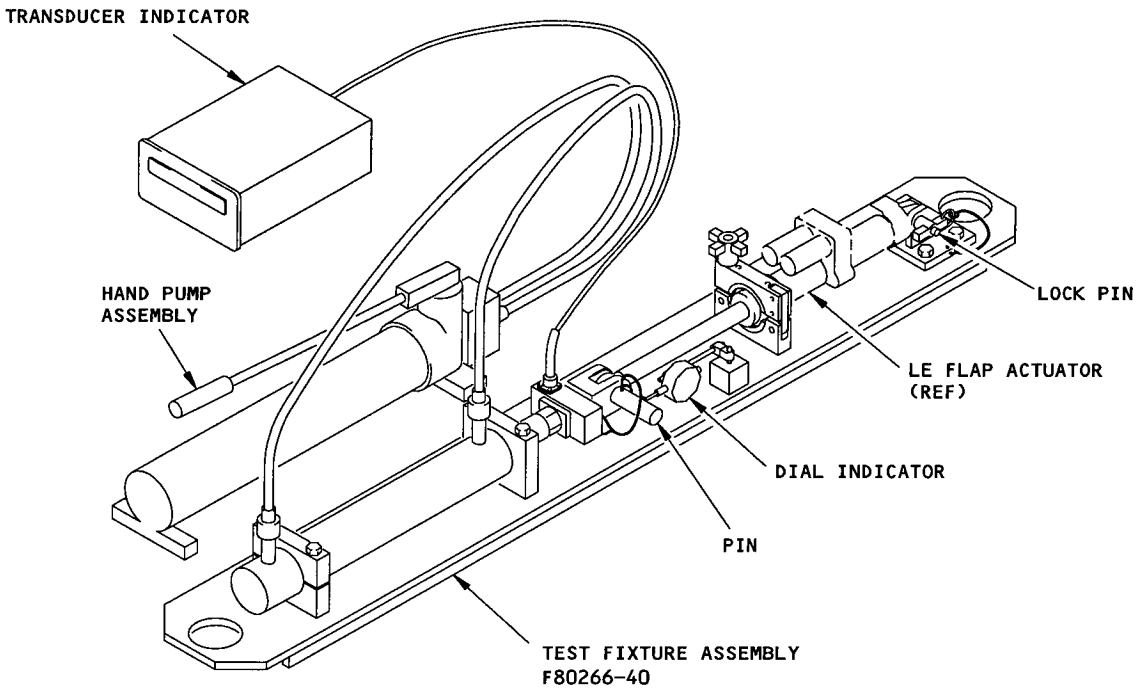
(1) Vent system A pressure-out port into a suitable container and close C1 pressure-out and C2 pressure -out ports.

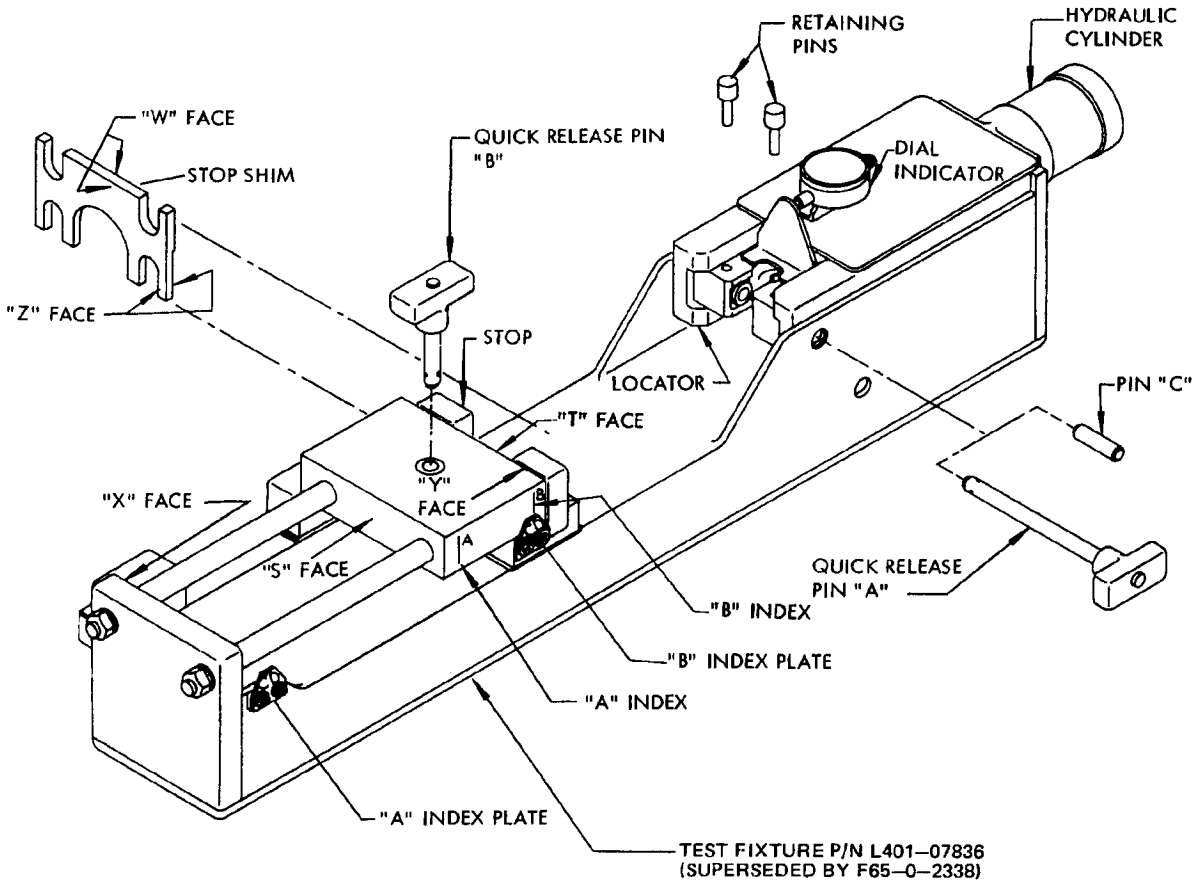
(2) Apply 2950 to 3050 psi fluid pressure to ALT system pressure-in port.

(3) Measure rate of flow from system A pressure-out port.

(4) Repeat steps (1), (2) and (3), venting C1 pressure-out port and C2 pressure-out port in turn. Check that rate of flow from each vented port is minimum of 0.3 cubic inch per second (300 cc per minute).

(5) Remove and replace jet (23, Fig. 1102) per 20-50-04 and Fig. 101 if test limits are not met.





Leading Edge Flap Actuator Pressure Testing Fixture
Figure 701

3. Preparation for Test of Leading Edge Flap Actuator Assembly

A. If necessary, install parts and fittings per figure 1103.

(1) Lubricate O-ring packings (5) and the threads of unions (4) with Skydrol Assembly Lube MCS 352. Place packings (5) on unions (4) and install in actuator assembly (15).

(2) After testing is completed, install bracket assembly (11), washers (10), bolts (9), washers (8), bulkhead elbows (7), nuts (6) and tube assemblies (1, 2 and 3).

B. Check that flap actuator assembly is filled with hydraulic fluid. Allow small quantity of fluid to overflow and check for absence of foaming and for cleanliness.

4. Perform Functional Tests (See figures 701, 702 and 1101.)

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

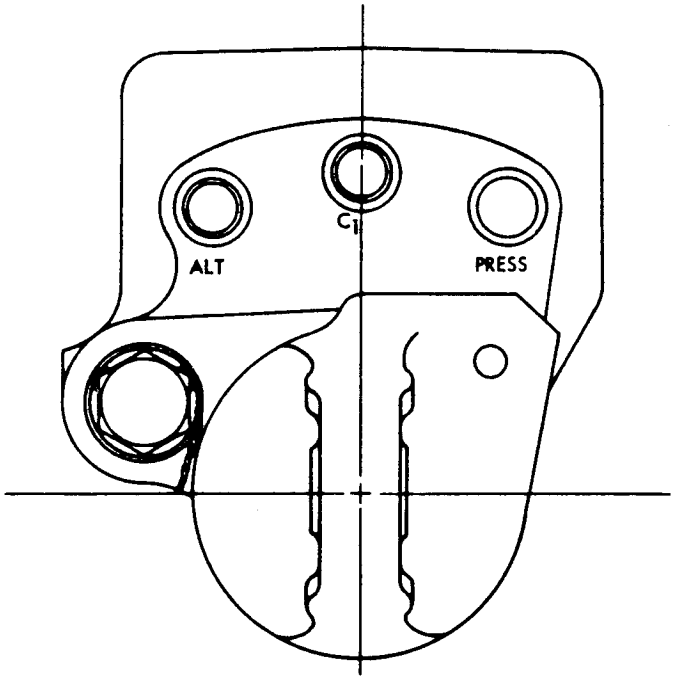
A. Install actuator assembly in suitable cycling fixture.

B. Perform break-in cycling.

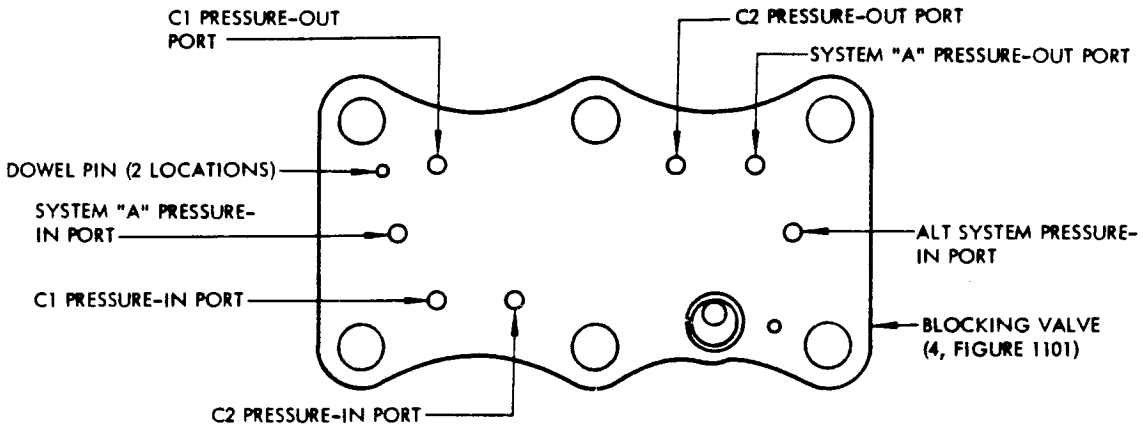
(1) Apply pressure at PRESS and C1 ports as shown in figure 702, and cycle actuator for 100 full stroke cycles. (Sequences 1, 2, and 1 per figure 702.)

NOTE: A cycle is defined as travel from completely retracted to completely extended position and back to completely retracted position. Pressure-cycle testing is necessary to reduce friction and assure reliability over a sustained period.

Pressure (PSI) Applied at Ports:				Actuator will Travel to Position:
Sequence	PRESS	C1	ALT	
1	2950 to 3050	40 to 50	40 to 50	Fully Retracted
2	2950 to 3050	2950 to 3050	40 to 50	Fully Extended
3	2950 to 3050	zero	2950 to 3050	Fully Extended



Cycling
Figure 702



Blocking Valve Assembly Pressure Port Locations
Figure 703

(2) Apply and remove pressure at the alternate (ALT) port with constant pressure at the PRESS port as shown in Fig. 702, and cycle actuator for 100 full stroke cycles. (Sequences 1, 3, and 1) Check that the external leakage rate during all break-in cycling does not exceed one drop per 25 cycles for each dynamic seal. There must be no leakage at any static seal.

C. Perform proof pressure and length checks

NOTE: While making test connections, use care to ensure that air is not added to the unit. All length tests must be conducted with no hydraulic pressure in the test fixture cylinder and with slides of fixture capable of moving freely.

(1) Install the flap actuator assembly in fixture, P/N F80266-40, F65-0-2338, or equivalent. (If test fixture F65-0-2338 is used, refer to manufacturer for instructions.) Secure lug end by inserting quick-release pin "A" or the lockpin through bearing (34). Insert quick-release pin "B" or the pin through bearing in rod end assembly (24).

(2) Connect ports to a hydraulic pressure source controllable from zero to 5400 psi.

CAUTION: ENSURE THAT NO ENTRAPPED AIR IS IN ACTUATOR. APPLY HYDRAULIC PRESSURE SLOWLY DURING ALL PROCEDURES. DO NOT EXTEND OR RETRACT ACTUATOR WHILE PROOF PRESSURE IS BEING APPLIED.

(a) Fix actuator assembly in the fully retracted position. Open the C1 and ALT ports. Apply pressure of 5350 to 5450 psi to the PRESSURE port. Hold for three minutes. Check that there is no external leakage or any evidence of permanent distortion.

(b) Reduce pressure at PRESSURE port to 3 to 7 psi and hold for three minutes. There must be no external leakage.

(3) Fix actuator assembly in the fully extended position in test fixture F80266-40, F65-0-2338, or equivalent. (If test fixture F65-0-2338 is used, refer to manufacturer for instructions.)

NOTE: In the following procedures, rod assembly (24, Fig. 1101) may be adjusted by loosening nut (15, Fig. 1101) and threading rod in or out as required.

(a) Open the ALT port and apply pressure of 5350 to 5450 psi simultaneously at PRESSURE port and Cl port. Hold for three minutes. Check that there is no external leakage or any evidence of permanent distortion.

(b) Reduce pressure at both ports to 3 to 7 psi, and hold for three minutes. There must be no external leakage.

(c) Open the PRESS and C1 ports. Apply pressure of 5350 to 5450 psi to the ALTERNATE port only. Hold for three minutes. Check that there is no external leakage or any evidence of permanent distortion.

(d) Reduce pressure at ALT port to 3 to 7 psi and hold for three minutes. There must be no external leakage.

(e) Install actuator in gage F67-0-1163 (per manufacturer's instructions), or in gage F80261-1. With pressure of 2950 to 3050 psi applied simultaneously at PRESS and C1 ports and 40 to 50 psi at ALT port, check that the distance between centerlines of bearings (26 and 34) is 22.515 to 22.565 inches.

(f) With pressure of 2950 to 3050 psi applied to PRESS port and 40 to 50 psi at all other ports, check that the distance between centerlines of bearings (26 and 34) is not more than 14.89 inches in retracted position. "B" index mark on slide must be within "C" and "D" marks on index plate.

(g) After length checks are complete, tighten nut (15, Fig. 1101) to a torque range of 1100 to 1300 pound-inches, aligning slot for lock (14, Fig. 1101) in correct position. Secure lock.

D. Check rod friction.

(1) Remove the blocking valve assembly (4) from flap actuator.

NOTE: This prevents the blocking valve from restricting fluid flow. If desired, test manifold F65-0-2190 or F80265-1 may be installed which provides flow equivalent to the blocking valve system "A" pressurized position, and step (2) following is not necessary.

(2) Submerge the valve mounting face fluid ports of the flap actuator under test fluid.

(3) Apply an axial force on the rod end of 80 pounds. Cycle the piston from the fully retracted to the fully extended and back to the fully retracted position. Beginning with the start of the cycle, the breakaway or running force at any time or any rod position shall not exceed 80 pounds in any position.

(4) After check is completed, reinstall blocking valve assembly (4).

E. Check actuation time.

(1) Perform timing tests with return pressure of 40 to 50 psi applied to all ports except as specified.

(2) Check timing for system A operation.

(a) Check retracted to extended position. Simultaneously apply pressure of 2950 to 3050 psi to PRESS and C1 ports, with actuator in fully retracted position. Elapsed time of actuation between pressure application and fully extended position stop must be within 2.9 to 4.4 seconds.

(b) Check extended to retracted position. Apply pressure of 2950 to 3050 psi to PRESS port, with actuator in fully extended position. Elapsed time of actuation between pressure application and stop at fully retracted position must be within 4.8 to 6.3 seconds.

(3) Perform timing check for ALT system operation.

(a) With actuator in the fully retracted position, apply 2950 to 3050 psi to ALT port. Elapsed time between pressure application and stop at fully extended position must be within 8 to 15 seconds for 65-44551-5,-6 (blocking valve 65-44741-5), and 15 to 19 seconds for 65-44551-7,-9 blocking valve 65-44741-7).

F. Perform blocking valve operation test (alternate system and system A).

(1) Support actuator so that no external force is applied to rod end.

(2) Vent port Cl to a container. Apply and maintain pressure of 2950 to 3050 psi at pressure port during the following tests.

(3) Gradually increase pressure at alternate port until actuator starts to extend. Check that:

(a) Pressure at alternate port to start and maintain actuator extension is 1400 to 1700 psi.

(b) Flow at port C1, during full extension stroke does not exceed 20 cc.

(4) Increase pressure at alternate port to 2000 psi, then gradually decrease pressure until actuator starts to retract. Check that:

(a) Pressure at alternate port to start and maintain actuator retraction is 800 to 1100 psi.

(b) Fluid flows from port C1 during actuator retraction.

G. Perform leakage tests. Using Flap Actuator Test Fixture, F80266-40, F65-0-2338, or equivalent, apply 40 to 50 psi hydraulic pressure at all ports except as specified. (If test fixture F65-0-2338 is used, refer to manufacturer for instructions.)

(1) Install actuator into test fixture with no applied pressures.

(2) If test fixture F65-0-2338 is being used for the test, exchange quick-release pin "A" in bearing of barrel end of actuator with round pin "C." Secure pin "C" in place with two retaining pins.

(3) Check internal leakage in fully extended position.

(a) If using test fixture F65-0-2338, then insert a suitable stop shim between "X" face of base and "S" face of slide assembly.

NOTE: Stop shim thickness must be sufficient to hold actuator at the fully extended position described in paragraph 4.C.(3)(e).

(b) Apply pressure of 2950 to 3050 psi to PRESS and C1 ports to fully extend actuator.

(c) Reduce the pressure at all ports to zero.

(d) Use hydraulic cylinder on end of test fixture to apply a 3400 to 3600 pound axial compressive force to barrel end of actuator. Set dial on test fixture to zero reading, to indicate length under axial compression.

(e) After one minute measure and record the piston travel as shown on dial indicator. The difference between the measured lengths must not exceed 0.15 inch.

NOTE: Measured rate of piston rod creep shall not exceed 0.15 inch per minute.

(4) Check internal leakage in fully retracted position.

(a) If using test fixture F65-0-2338 then insert "Z" faces (thin portion) of stop shim between "Y" face of stop and "T" face of slide assembly.

(b) Apply pressure of 2950 to 3050 psi to PRESS port, with 40 to 50 psi at other ports to fully retract the piston.

(c) Reduce the pressure at all ports to zero.

(d) Use hydraulic cylinder on end of test fixture to apply a 620- to 720-pound axial tension force to barrel end of actuator. Set dial on test fixture to zero reading, to indicate length under axial tension.

(e) After 1 minute measure and record piston travel as shown on dial indicator. The difference between the measured lengths must not exceed 0.37 inch.

NOTE: Measured rate of piston rod creep shall not exceed 0.37 inch per minute.

(5) Deleted.

H. Check blocking valve seal external leakage.

(1) Place actuator is fully extended position.

(2) Apply pressure of 2950- to 3050-psi at ALT port for 1 second, and then reduce pressure to zero psi at ALT port for 1 second.

(3) Repeat cycling process for 50 cycles.

(4) Check that leakage at retainer cap (8, Fig. 1102) does not exceed one drop in 25 cycles.

NOTE: Leakage is an indication that packing (13, Fig. 1102) is defective.

5. After testing is completed, perform the following steps.

A. If Skydrol 7000 hydraulic fluid was used for testing, drain unit thoroughly, flush and fill with BMS 3-11 hydraulic fluid.

B. If necessary, install parts per TESTING paragraph 3.A. See Fig. 704 for identification of tube assemblies.

C. Install lockwire and apply sealant per ASSEMBLY.

Symbol	Tape	Legend
←—— SFD	BACT11YS11R	STANDBY SYSTEM FLAP DOWN
FD ——→	BACT11YF3R	FLAP DOWN
AP ——→	BACT11YS14R	SYSTEM A PRESSURE

Tube Assembly Identification
Figure 704

TROUBLE SHOOTING

Trouble	Possible Cause	Correction
Leakage at plug (9)	Defective packings (11) or retainers (13)	Replace parts
Leakage at gland nut (17)	Defective retainer (18), seal (19), packing (20), or gland (21)	Replace parts
Leakage at caps (1 or 8, Fig 1102) or at splitline mounting of valve assembly (4)	Defective rings and or packing (6, 7, 8, 13, Fig 1102) or gasket plate (5)	Replace parts
Leakage at plug (6)	Defective packing or retainer (7 or 8)	Replace parts
Piston fails to extend or retract properly	Foreign material, or improperly assembled piston and rod (27); defective blocking valve (4)	Examine and clean or replace parts
System A flowrate out of limit	Worn jet (23, Fig.1102)	Replace jet per Fig. 101.

STORAGE INSTRUCTIONS

1. At completion of functional test, return unit to retracted position. Do not use compressed air at ports at any time.

2. Fill unit with BMS 3-11 hydraulic fluid. Cap or plug ports with suitable caps or plugs having hydraulic fluid resistant gaskets.

3. Wrap and protect unit in accordance with standard industry practices and the information contained in 20-44-02 and 20-70-01.

SPECIAL TOOLS, FIXTURES AND EQUIPMENT

NOTE: Equivalent substitutes may be used for listed items.

1. Hydraulic Test Stand -- Supplies controlled pressure from 0 to 5400 psi
2. L401-07836 -- Leading Edge Flap Actuator Test Fixture *[1] *[2]
3. XIE 65-44551-1 parts 3 and 4 -- Wrench *[1]
4. F80-0-1552-17 -- Torque Wrench Adapter *[3]
5. F42-0-228 -- Special Vise Jaws *[3]
6. F65-0-2338 -- Leading Edge Flap Actuator Test Fixture *[3] *[4]
7. F67-0-1163 -- Leading Edge Flap Actuator Gage *[3]
8. F65-0-2190 -- Leading Edge Flap Actuator Test Manifold *[3]
9. F80259-4 -- Torque Wrench Adapter (Replaces F80-0-1552-17)
10. F80261-1 -- Leading Edge Flap Actuator Gage (Replaces F67-0-1163)
11. F80264-1 -- Vise Jaw Set (Replaces F42-0-228)
12. F80265-1 -- Leading Edge Flap Actuator Test Manifold (Replaces F65-0-2190)
13. F80266-30 -- Leading Edge Flap Acutator Test Fixture (Superseded by F80266-40) (Supersedes F80266-1) (Replaces F65-0-2338)
14. F80266-40 (Supersedes F80266-30)

*[1] Quality Engineering Company Inc., 1048 King Industrial Drive, Marietta, Georgia 30062

*[2] Superseded by Test Fixture F65-0-2338

*[3] Parker Hannifin Corp., Contracts Dept., Hydraulics Div., 18321 Jamboree Blvd., P.O. Box C-19510, Irvine, California 92713

*[4] Supersedes Test Fixture L401-07836. Replaced by Test Fixture F80266-30.

ILLUSTRATED PARTS LIST

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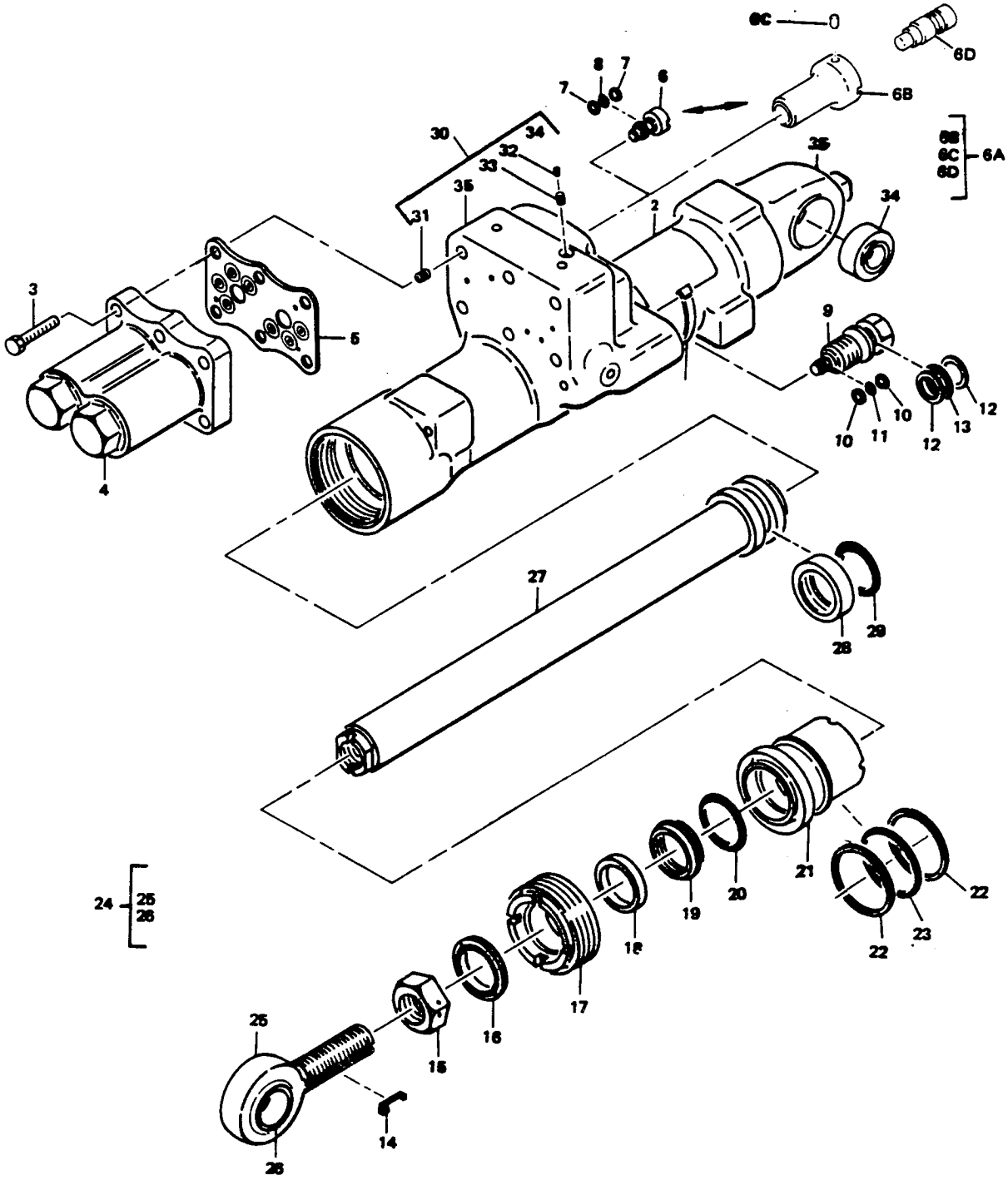


Leading Edge Flap Actuator Assembly
Figure 1101

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
	65-44551-5		ACTUATOR ASSY, LEADING EDGE FLAP	A	RF
	65-44551-6		ACTUATOR ASSY, LEADING EDGE FLAP	B	RF
	65-44551-7		ACTUATOR ASSY, LEADING EDGE FLAP	C	RF
	65-44551-9		ACTUATOR ASSY, LEADING EDGE FLAP	D	RF
1	69-35587-4		. STRAP		1
2	BAC27NCT0288		. NAMEPLATE (PREF)		1
2	BACN12A3LY		. NAMEPLATE (OPT)		1
3	MS24673-12		. SCREW		6
4	65-44741-5		. VALVE ASSY, BLOCKING (FIG. 1102)	AB	1
4	65-44741-7		. VALVE ASSY, BLOCKING (FIG. 1102)	CD	1
5	69-35704-2		. PLATE, GASKET (PREF)		1
5	69-35704-1		. PLATE, GASKET (OPT)		1
6	69-35777-1		. PLUG, RESTRICTOR	AB	1
6	69-35777-3		. PLUG, RESTRICTOR (PREF) *[6]*[7]	D	1
6	69-35777-1		. PLUG, RESTRICTOR (OPT) *[6]*[7]	CD	1
6A	69-72071-1		. RESTRICTOR ASSY *[6]*[7]	CD	1
6B	69-72071-3		. . PLUG		1
6C	69-72071-4		. . PELLET, NYLON		1
6D	JETX0301040AC		. . RESTRICTOR, V92555		1
7	MS28782-2		. RETAINER (PREF) *[6]*[7]		2
7	S12766-007		. RETAINER V97820 (OPT) *[6]*[7]		2
8	NAS1611-007		. PACKING, O-RING *[6]*[7]		1
9	69-54576-1		. PLUG *[1]		1
10	MS28782-5		. RETAINER (PREF) *[1]		2
10	S12766-010		. RETAINER, V97820 (OPT) *[1]		2
11	NAS1611-010		. PACKING, O-RING *[1]		1
12	MS28782-12		. RETAINER (PREF) *[1]		2
12	S12766-114		. RETAINER, V97820 (OPT) *[1]		2
13	NAS1611-114		. PACKING, O-RING *[1]		1
14	NAS559-5		. LOCK		1
15	NAS509-12		. NUT	A	1
15	NAS1423-12		. NUT, JAM	BCD	1
16	BACS34A13A		. SCRAPER		1
17	69-54560-1		. NUT, GLAND		1
18	69-35716-1		. RETAINER, SEAL		1
19	BACS11AA218A		. SEAL, FOOT		1
20	NAS1611-218		. PACKING, O-RING		1
21	69-54559-1		. GLAND, SEAL		1
21	65C31198-5		. GLAND, SEAL *[2]		1
22	MS28782-27		. RETAINER, (PREF)		2
22	S12766-222		. RETAINER, V97820 (OPT)		2
22	BACR12BM-223		. RETAINER *[2]		2
23	NAS1611-222		. PACKING, O-RING		1
23	NAS1611-223		. PACKING, O-RING *[2]		1
24	69-35641-1		. ROD END ASSY		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
25	69-35641-2		. . ROD END		1
26	MS21230-10		DELETED		
26	MS14103-10		. . BEARING (PREF)		1
26	BLFR10-146		. . BEARING, V81376 (BOEING 10-60545-145S) (OPT)		1
26	KWB10N8		. . BEARING, V97613 (BOEING 10-60545-145S) (OPT)		1
26	SBSH20ATC38		. . BEARING, V21335 (BOEING10-60545-145S) (OPT)		1
26	TGA110D		. . BEARING, V77896 (BOEING 10-60545-145S) (OPT)		1
26	03-726-10		. . BEARING, V09455 (BOEING 10-60545-145S) (OPT)		1
27	65-44909-4		. PISTON AND ROD (OPT)	ABC	1
27	65-44909-3		. PISTON AND ROD	D	1
27	65-44909-3		. PISTON AND ROD (PREF)	ABC	1
27	65-44909-1		. PISTON AND ROD (OPT)	ABC	1
28	69-54540-220		. CAP RING, PISTON SEAL		1
29	NAS1611-220		. PACKING, O-RING		1
30	65-44552-1		. BARREL ASSY (OPT TO 65-44702-1) *[1]	A	1
30	65-44702-1		. BARREL ASSY (OPT TO 65-44552-1) *[1]	A	1
30	65-44552-4		. BARREL ASSY (PREF)	BCD	1
30	65-44552-1		. BARREL ASSY (OPT) *[1]	BCD	1
30	65-44702-1		. BARREL ASSY (OPT) *[1]	BCD	1
30	65C31198-6		DELETED		
30	65C31198-7		DELETED		
30	65C31198-8		DELETED		
30	65C31198-11		. BARREL ASSY (OPT) *[2]*[3]		1
30	65C31198-12		. BARREL ASSY (OPT) *[2]*[4]		1
30	65C31198-13		. BARREL ASSY (OPT) *[2]*[5]		1
31	MS21209F4-15		. . INSERT		8
32	BACP20AX12DP		. . PIN		8
33	BACP20AX12D		. . PLUG		8
34	ADSB8V202		. . BEARING, V15860 (BOEING 10-60545-140SA)		1
34	KSC129908P		. . BEARING, V50632 (BOEING 10-60545-140SA)		1
34	WHT8V101		. . BEARING, V50294 (BOEING 10-60545-140SA)		1
34	WRRG8BACH		. . BEARING, V73134 (BOEING 10-60545-140SA)		1
34	03-826-08E003		. . BEARING, V09455 (BOEING 10-60545-140SA)		1
34	ABWT8V103		. . BEARING, V50294 (BOEING 10-60545-140S) (OPT)		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
34	NHSB8V202		. . BEARING, V15860 (BOEING 10-60545-140S) (OPT)		1
34	WRG8BACH		. . BEARING, V73134 (BOEING 10-60545-140S) (OPT)		1
34	SBS16ATC32-2		. . BEARING, V21335 BOEING 10-60545-140S) (OPT)		1
34	KSBN8-21		. . BEARING, V97613 BOEING 10-60545-140S) (OPT)		1
34	YTA145		. . BEARING, V77896 (BOEING 10-60545-140S) (OPT)		1
34	BLFR8-026		. . BEARING, V81376 (BOEING 10-60545-140S) (OPT)		1
34	03-730-0500		. . BEARING, V09455 (BOEING 10-60545-140S) (OPT)		1
34	03-729-0500		DELETED		
35	65-44552-5		. . BARREL (USED ON 65-44552-4)		1
35	65-44552-2		. . BARREL (USED ON 65-44552-1)		1
35	65-44702-2		. . BARREL (USED ON 65-44702-1)		1
35	65C31198-15		. . BARREL (USED ON 65C31198-11) *[3]		1
35	65C31198-16		. . BARREL (USED ON 65C31198-12) *[4]		1
35	65C31198-17		. . BARREL (USED ON 65C31198-13) *[5]		1
36	65C31198-14		. . SLEEVE (USED ON 65C31198-11, -12, -13) *[3] *[4] *[5]		1

*[1] PLUG (9), RETAINERS, (10, 12), PACKINGS (11, 13) USED WITH BARREL ASSYS 65-44552-1, 65-44702-1.

*[2] SEAL GLAND 65C31198-5, PACKING NAS1611-223, AND RETAINER BACR12BM-223 ARE USED WITH STEEL SLEEVED BARREL ASSEMBLIES 65C31198-11, -12, -13.

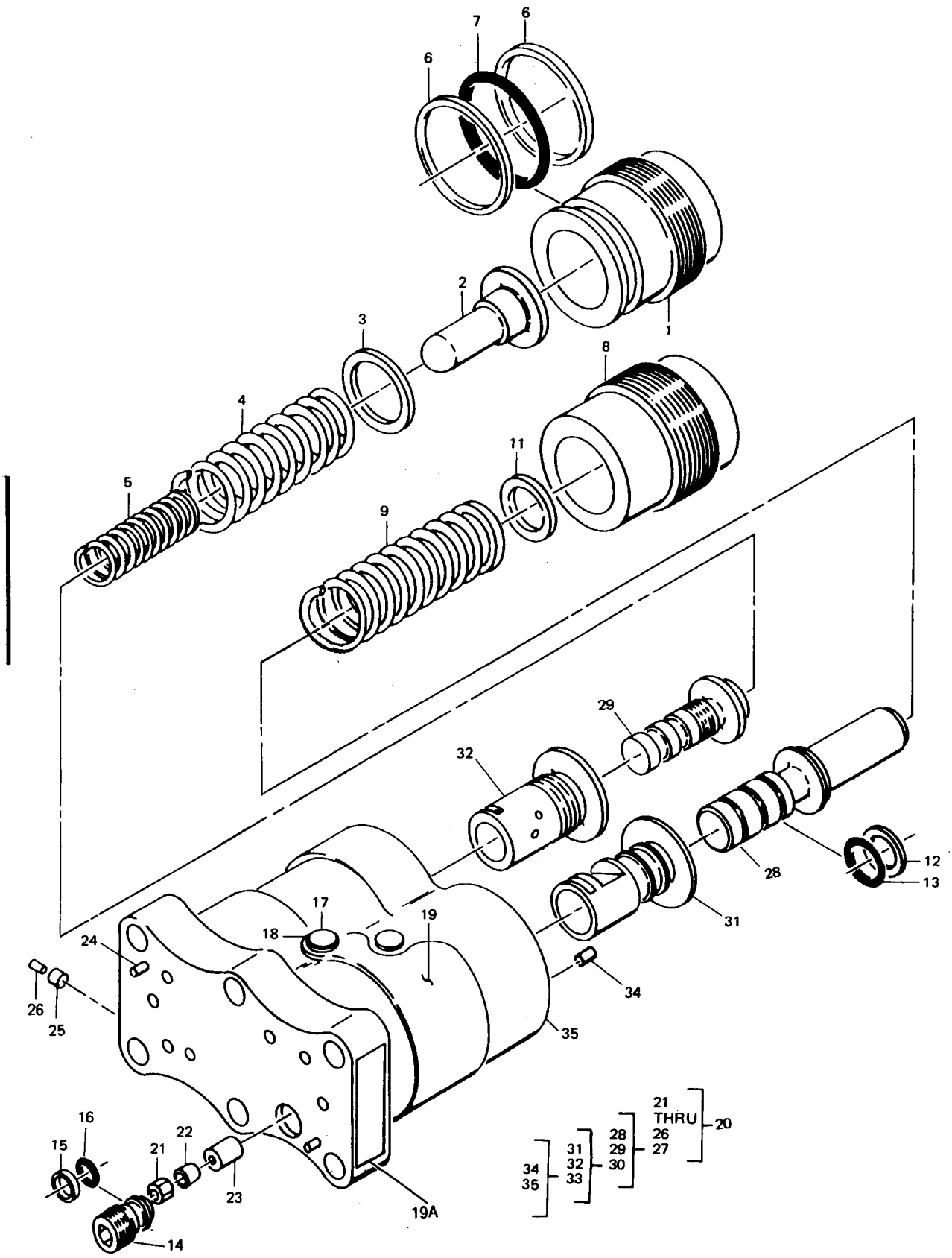
*[3] BARREL ASSEMBLY 65C31198-11 IS MADE FROM BARREL 65C31198-15 AND SLEEVE 65C31198-14. BARREL 65C31198-15 IS MADE BY REWORKING BARREL ASSEMBLY 65-44552-1.

*[4] BARREL ASSEMBLY 65C31198-12 IS MADE FROM BARREL 65C31198-16 AND SLEEVE 65C31198-14. BARREL 65C31198-16 IS MADE BY REWORKING BARREL ASSEMBLY 65-44552-4.

*[5] BARREL ASSEMBLY 65C31198-13 IS MADE FROM BARREL 65C31198-17 AND SLEEVE 65C31198-14. BARREL 65C31198-17 IS MADE BY REWORKING BARREL ASSEMBLY 65-44702-1

*[6] 69-35777-1 COMBINED WITH NAS1611-007 AND TWO MS28782-2, ARE OPTIONAL TO 69-72071-1 ON 65-44551-7, AND -9 ACTUATOR ASSEMBLIES.

*[7] 69-35777-3 COMBINED WITH NAS1611-007 AND TWO MS28782-2, ARE OPTIONAL TO 69-72071-1 ON 65-44551-9 ACTUATOR ASSEMBLY.

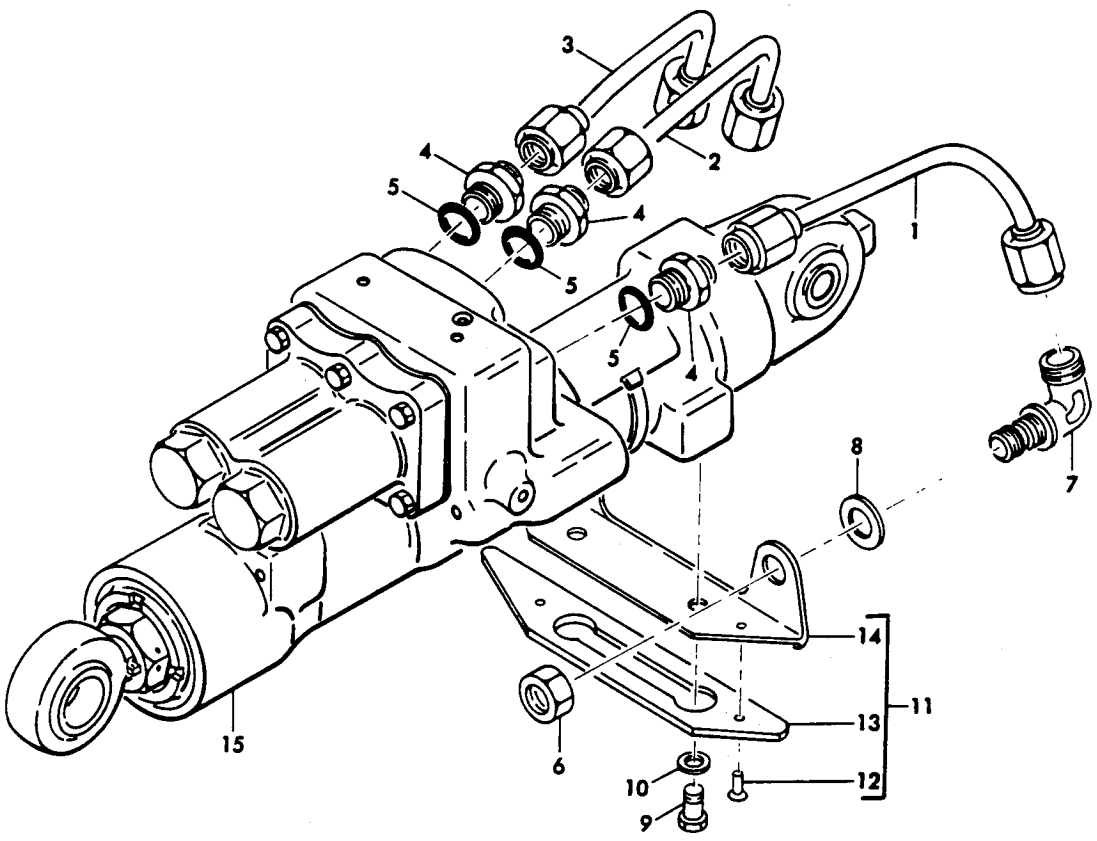


Blocking Valve Assembly
Figure 1102

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102-					
	65-44741-5		BLOCKING VALVE ASSY	A	RF
	65-44741-7		BLOCKING VALVE ASSY	B	RF
1	69-35884-1		. CAP, RETAINER		1
2	69-35883-1		. STOP		1
3	69-35885-2		. SHIM		1
4	69-35944-1		. SPRING, OUTER		1
4	69-66648-1		. SPRING, OUTER (OPT)		1
5	69-35945-1		. SPRING, INNER		1
6	S11109-119		. RING, BACKUP, V97820		2
7	NAS1611-119		. PACKING		1
8	69-35860-2		. CAP, RETAINER		1
9	69-35861-1		. SPRING		1
11	69-35900-1		. SHIM (PREF)		1
11	69-35784-1		. SHIM (OPT) (3 MAX)		AR
12	MS28782-4		. RING, BACKUP		1
13	NAS1611-009		. PACKING		1
14	69-35836-1		. PLUG		1
15	MS28782-1		. RING, BACKUP (PREF)		1
15	S12766-006		. RING, BACKUP, V97820 (OPT)		1
16	NAS1611-006		. PACKING		1
17	MS2047ODD3-18		. RIVET (USED WITH 87091, BAC27DHY364 AND BACN12A3MW)		1
18	AN960C3L		. WASHER (REPLD BY NAS1149CN316R) (USED WITH 87091, BAC27DHY364 AND BACN12A3MW)		2
18	NAS1149CN316R		. WASHER (REPLS AN960C3L) (USED WITH 87091, BAC27DHY364 AND BACN12A3MW)		2
19	BACN12A3MW		. NAMEPLATE (OPT)		1
19	87091		. NAMEPLATE (OPT)		1
19	BAC27DHY364		. NAMEPLATE (PREF)		1
19A	BAC27DHY214		. NAMEPLATE		1
20	65-56687-6		. HOUSING ASSY	A	1
20	65-56687-12		. HOUSING ASSY	B	1
21	69-35808-1		. . RETAINER (USED ON 65-56687-6)		1
22	EX34235		. . SCREEN, FILTER, V92555 (USED ON 65-56687-6)		1
23	EX31505		. . JET, V92555 (USED ON 65-56687-6)		1
23	JETX0510110AB		. . JET, V92555 (USED ON 65-56687-12)		1
24	MS16562-192		. . PIN, DOWEL (PREF)		2
24	MS16555-604		. . PIN, DOWEL (OPT)		2
25	BACP20AX12P		. . PIN		4
26	BACP20AX12		. . PLUG		4
27	65-56687-7		. . HOUSING ASSY (USED ON 65-56687-6)		1
27	65-56687-17		. . HOUSING ASSY (USED ON 65-56687-12)		1
28	69-35854-1		. . . SLIDE *[1]		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102-					
29	69-35880-1		. . . SLIDE *[1]		1
30	65-56687-8		. . . HOUSING ASSY (USED ON 65-56687-7)		1
30	65-56687-18		. . . HOUSING ASSY (USED ON 65-56687-17)		1
31	69-35852-1		. . . . SLEEVE *[1]		1
32	69-35879-1		. . . . SLEEVE *[1]		1
33	65-44742-4		. . . . HOUSING ASSY (USED ON 65-56687-8) *[1]		1
33	65-44742-7		. . . . HOUSING ASSY (USED ON 65-56687-18) *[1]		1
34	MS16555-601		. . . . . DOWEL, PIN		4
35	65-44742-5		. . . . . HOUSING (USED ON 65-44742-4)		1
35	65-44742-8		. . . . . HOUSING (USED ON 65-44742-7)		1
35	65-44742-9		. . . . . HOUSING (USED ON 65-44742-7) (OPT TO 65-44742-8)		1

*[1] SLIDES (28, 29) MATCHED WITH SLEEVES (31, 32) RESPECTIVELY. SLEEVES (31, 32) MATCHED WITH HOUSING (33).



Leading Edge Flap Actuator Assembly
Figure 1103

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1103-					
	65-44550-14		ACTUATOR ASSY, LEADING EDGE FLAP	A	RF
	65-44550-15		ACTUATOR ASSY, LEADING EDGE FLAP	B	RF
	65-44550-16		ACTUATOR ASSY, LEADING EDGE FLAP	C	RF
	65-44550-18		ACTUATOR ASSY, LEADING EDGE FLAP	D	RF
	65-44550-20		ACTUATOR ASSY, LEADING EDGE FLAP	E	RF
1	65-44550-3		. TUBE ASSY	A	1
2	65-44550-4		. TUBE ASSY	A	1
3	65-44550-5		. TUBE ASSY	A	1
4	MS21902-4		. UNION		3
5	NAS1612-4		. PACKING O-RING		3
6	AN924-4D		DELETED		
6	AN924D4		. NUT	A	3
7	MS21908-4		. ELBOW, BULKHEAD	A	3
8	AN960PD716		. WASHER	A	3
9	BACB30NE4H2		. BOLT	A	2
10	AN960PD416L		. WASHER	A	2
11	69-35870-1		. BRACKET ASSY	A	1
12	MS20426A3		. . RIVET		2
13	69-35870-3		. . SHIELD, ABRASION		1
14	69-35870-2		. . BRACKET		1
15	65-44551-5		. ACTUATOR ASSY (FIG. 1101)	AB	1
15	65-44551-6		. ACTUATOR ASSY (FIG. 1101)	C	1
15	65-44551-7		. ACTUATOR ASSY (FIG. 1101)	D	1
15	65-44551-9		. ACTUATOR ASSY (FIG. 1101)	E	1

V09455	LEAR SIEGLER INC., TRANSPORT DYNAMICS DIV., P.O. BOX 1953, 3131 WEST SEGERSTROM ST., SANTA ANA, CALIFORNIA 92702
V15860	NEW HAMPSHIRE BALL BEARINGS, INC., ASTRO DIV., 155 LEXINGTON AVE., LACONIA, NEW HAMPSHIRE 03246
V21335	FAFNIR BEARING CO., DIV. OF TEXTRON, INC., 37 BOOTH ST., NEW BRITAIN, CONNECTICUT 06050
V50294	NMB AMERICA, INC., 9730 INDEPENDENCE AVE., CHATSWORTH, CALIFORNIA 91311
V50632	KAMATICS CORP., 1335 BLUE HILLS RD., BLOOMFIELD, CONNECTICUT 06002
V73134	HEIM UNIVERSAL CORP., INCOM INTERNATIONAL, INC., 60 ROUND HILL RD., FAIRFIELD, CONNECTICUT 06430
V77896	REXNORD, INC., BEARING DIV., 2400 CURTIS ST., DOWNERS GROVE, ILLINOIS 60515
V81376	SOUTHWEST PRODUCTS CO., P.O. BOX 1026, MONROVIA, CALIFORNIA 91016
V92555	LEE COMPANY, 2 PETTIPAUG RD, WESTBROOK, CONNECTICUT 06498
V97613	SARGENT INDUSTRIES, KAHR BEARING DIV., 3010 N. SAN FERNANDO RD., BURBANK, CALIFORNIA 91503
V97820	W. S. SHAMBAN & CO., 711 MITCHELL RD., NEWBURY PARK, CALIFORNIA 91320

Part No.	Fig. and Index No.	Qty. per Assy
ABWT8V103	1101-34	1
ADSB8V202	1101-34	1
AN924-4D		AR
AN960C3L		AR
AN960PD416L		AR
AN960PD716		AR
BACB30NE4H2	1103-9	2
BACN12A3MW	1102-19	1
BACP20AX12	1102-26	4
BACP20AX12D	1101-33	8
BACP20AX12DP	1102-32	8
BACP20AX12P	1102-25	4
BACR12BM-223		AR
BACS11AA218A	1101-19	1
BACS34A13A	1101-16	1
BAC27DHY214	1102-19A	1
BLFR10-146	1101-26	1
BLFR8-026	1101-34	1
EX31505	1102-23	1
EX34235	1102-22	1
JETX0301040AC	1101-6D	1
JETX0510110AB	1102-23	1
KSBN8-21	1101-34	1
KSC129908P	1101-34	1
KWB10N8	1101-26	1
MS14103-10		AR
MS16555-601		AR
MS16555-604		AR
MS16562-192		AR
MS20426A3		AR
MS20470DD3-18		AR
MS21209F4-15		AR
MS21902-4		AR
MS21908-4		AR
MS24673-12		AR
MS28782-1		AR
MS28782-12		AR
MS28782-2		AR
MS28782-27		AR
MS28782-4		AR
MS28782-5		AR

Part No.	Fig. and Index No.	Qty. per Assy
NAS1423-12		AR
NAS1611-006		AR
NAS1611-007		AR
NAS1611-009		AR
NAS1611-010		AR
NAS1611-114		AR
NAS1611-119		AR
NAS1611-218		AR
NAS1611-220		AR
NAS1611-222		AR
NAS1611-223		AR
NAS1612-4		AR
NAS509-12		AR
NAS559-5		AR
NHSB8V202	1101-34	1
SBSH20ATC38	1101-26	1
SBS16ATC32-2	1101-34	1
S11109-119	1102-6	2
S12766-006	1102-15	1
S12766-007	1101-7	2
S12766-010	1101-10	2
S12766-114	1101-12	2
S12766-222	1101-22	2
TGA110D	1101-26	1
WHT8V101	1101-34	1
WRG8BACH	1101-34	1
WRRG8BACH	1101-34	1
YTA145	1101-34	1
03-726-10	1101-26	1
03-730-0500	1101-34	1
03-826-08E003	1101-34	1
10-60545-140S	1101-34	1
10-60545-140SA	1101-34	1
10-60545-145S	1101-26	1
65-44550-3	1103-1	1
65-44550-4	1103-2	1
65-44550-5	1103-3	1
65-44550-14	1103	RF
65-44550-15	1103	RF

Part No.	Fig. and Index No.	Qty. per Assy.
65-44550-16	1103	RF
65-44550-18	1103	RF
65-44550-20	1103	RF
65-44551-5	1101	RF
65-44551-5	1103-15	1
65-44551-6	1101	RF
65-44551-6	1103-15	1
65-44551-7	1101	RF
65-44551-7	1103-15	1
65-44551-9	1101	RF
65-44551-9	1103-15	1
65-44552-1	1101-30	1
65-44552-2	1101-35	1
65-44552-4	1101-30	1
65-44552-5	1101-35	1
65-44702-1	1101-30	1
65-44702-2	1101-35	1
65-44741-5	1101-4	1
65-44741-5	1102	RF
65-44741-7	1101-4	1
65-44741-7	1102	RF
65-44742-4	1102-33	1
65-44742-5	1102-35	1
65-44742-7	1102-33	1
65-44742-8	1102-35	1
65-44742-9	1102-35	1
65-44909-1	1101-27	1
65-44909-3	1101-27	1
65-44909-4	1101-27	1
65-56687-12	1102-20	1
65-56687-17	1102-27	1
65-56687-18	1102-30	1
65-56687-6	1102-20	1
65-56687-7	1102-27	1
65-56687-8	1102-30	1
65C31198-5	1101-21	1
65C31198-6	1101-30	1
65C31198-7	1101-30	1
65C31198-8	1101-30	1
65C31198-11	1101-30	1
65C31198-12	1101-30	1
65C31198-13	1101-30	1
65C31198-14	1101-36	1
65C31198-15	1101-35	1
65C31198-16	1101-35	1
65C31198-17	1101-35	1
69-35587-4	1101-11	1

Part No.	Fig. and Index No.	Qty. per Assy.
69-35641-1	1101-24	1
69-35641-2	1101-25	1
69-35704-1	1101-5	1
69-35716-1	1101-18	1
69-35777-1	1101-6	1
69-35784-1	1102-11	AR
69-35808-1	1102-21	1
69-35836-1	1102-14	1
69-35852-1	1102-31	1
69-35854-1	1102-28	1
69-35860-2	1102-8	1
69-35861-1	1102-9	1
69-35870-1	1103-11	1
69-35870-2	1103-14	1
69-35879-1	1102-32	1
69-35880-1	1102-29	1
69-35883-1	1102-2	1
69-35884-1	1102-1	1
69-35885-2	1102-3	1
69-35900-1	1102-11	1
69-35944-1	1102-4	1
69-35945-1	1102-5	1
69-54540-220	1101-28	1
69-54559-1	1101-21	1
69-54560-1	1101-17	1
69-54576-1	1101-9	1
69-66648-1	1102-4	1
69-72071-1	1101-6A	1
69-72071-3	1101-6B	1
69-72071-4	1101-6C	1