TO: ALL HOLDERS OF TRAILING EDGE FLAP CONTROL VALVE ASSEMBLY, 27-53-11

REVISION NO. 10, DATED MAR 1/01

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
Revised null position test information								X					

TRAILING EDGE FLAP CONTROL VALVE ASSEMBLY

27-53-11

BOEING P/N 65-44821-1, -2, -3, -4
65-51602-2, -29, -30

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 31941	Dec 10/71
		PRR 32142	Jun 25/73

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
	27-53-11					
	T-1	Jun 25/73				
	T-2	BLANK				
*	LEP-1	Mar 1/01				
	LEP-2	BLANK				
	T/C-1	Aug 15/68				
	T/C-2	BLANK				
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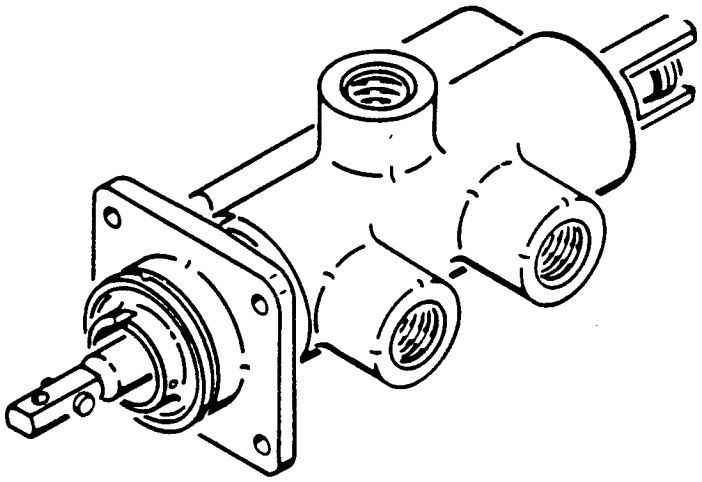
TRAILING EDGE FLAP CONTROL VALVE ASSEMBLY



Trailing Edge Flap Control Valve Assembly
Figure 1

DESCRIPTION AND OPERATION

1. Description

   A. The trailing edge flap control valve assembly consists of a matched set of sleeve and slide housed in the cylinder bore of a body. The body has a pressure supply port, a return port, and two control ports.

2. Operation

   A. The trailing edge flap control valve assembly is attached to the flap control unit located in the right wheel well of the airplane. The unit is mechanically operated to control directional movement of the trailing edge flaps. Extension or retraction of the slide connects one control port to the return port.

3. Leading Particulars

   Length (overall) -- 9.5 inches
   Height (overall) -- 2.75 inches
   Width (overall) -- 3.25 inches
   Weight -- 2.7 pounds

DISASSEMBLY

1. If installed, remove unions (1 and 2) and packings (3) from valve assembly (4). (See figure 1102.)

2. Straighten flared end of pin (1, P/N 66-22838-1), and remove from slide (11) or remove pin (1) P/N MS51923-164, from slide (11). (See figure 1101.)

3. Cut lockwire and remove nut (2) from body (14) using spanner wrench F71290-10.

4. Carefully push slide assembly (9) out of bore of body (14).

   CAUTION: SLIDE ASSEMBLY (9) CONSISTS OF PRECISION PARTS. KEEP PARTS TOGETHER AT ALL TIMES AS A MATCHED SET. AVOID ALL UNNECESSARY HANDLING. PARTS SHOULD BE PROTECTED AT ALL TIMES, WHEN NOT IN WORK, BY PLACING IN AN ADEQUATE CONTAINER.

5. Disassemble nut (3) and washer (4).

6. Pull off retainer (5). Remove packings (6 and 7) and backup rings (8) from sleeve (10).

7. Remove nameplate (13) and strap (12) from body (14).

CLEANING

1. Wash all metal parts with dry cleaning solvent, Federal Specification P-D-680.

2. Clean all bores, holes, threads and, passages with stiff bristle brush to remove stubborn accumulations of foreign matter.

3. Rinse and dry thoroughly with dry compressed air or with clean, lint-free cloth.

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

INSPECTION/CHECK

1. Visually examine all metal parts for cracks, burrs, and corrosion using strong light and 10-power magnification.

2. Carefully check sleeve (10) and slide (11) for damage to edges of grooves, passages, and lands.

3. Check all plated surfaces for blisters or flaking.

4. Perform a fluorescent dye penetrant check on body (14).

5. Check nameplate (13) for legibility.

6. Lubricate slide (11) and sleeve (10) with BMS 3-11 hydraulic fluid. Turn assembly on end. Slide must move by its own weight at each of three positions approximately 120 degrees apart with respect to sleeve.

REPAIR

1. Repair

   A. Remove minor scratches, nicks, and corrosion by polishing with 220 grit or finer aluminum oxide abrasive cloth except on slide (11) and sleeve (10).

   B. Chase or file minor thread damage.

2. Refinish (See figure 1101.)

   NOTE: Refer to Subject 20-30-02 for stripping of protective finishes and to Subject 20-41-01 for decoding F- and SRF- symbols and their BAC equivalents.

   A. If plated or painted surfaces are worn or chipped, refinish parts listed below as indicated.

      (1) Pin (1) -- F-2.26 all over.

      (2) Nut (2) -- F-2.26 all over.

      (3) Retainer (5) -- F-4.201 on flange face only.

      (4) Slide (11) -- F-1.842 to shaft on both ends from 0.03 inch groove on outwards. Grind chrome plate to 0.4970 to 0.4975 inch diameter and 16 microinch finish. Apply F-1.1923 to thread only.

      (5) Body (14) -- F-2.26 all over.

3. Replacement

   A. Replace packings (6 and 7) at each overhaul.

   B. Replace parts found unserviceable or which are damaged beyond simple repair, or worn beyond allowable limits.

   C. If slide (11) or sleeve (10) needs replacement, replace both parts as an assembly and matched set.

ASSEMBLY

1. Coat nut (2) and port threads of body (14) with MIL-G-23827 grease. (See figure 1101.)

2. Lightly lubricate packings (6 and 7) and backup rings (8) with BMS 3-11 hydraulic fluid.

3. Install nameplate (13) on body (14). Secure with strap (12).

4. Install packings (6 and 7) and backup rings (8) on sleeve (10) per Subject 20-50-06.

5. Insert slide (11) in sleeve (10). Assemble washer (4) and nut (3) on sleeve.

6. Insert slide assembly (9) in bore of body (14) until bottomed.

7. Position seal retainer (5) on slide (11). Screw nut (2) into body. Tighten to 50 pound-inches torque maximum using spanner wrench F71290-10. Lockwire nut to body.

8. Install pin (1), P/N 66-22838-1, in slide with BMS 10-11, Type I primer. Flare end of pin 80 to 90 degrees. Press or squeeze swage.

   CAUTION: DO NOT RIVET BY HAMMERING.

9. Install pin (1), P/N MS51923-164, in slide with BMS 10-11, Type I primer.

   NOTE: Pin (1) shall not protrude more than 0.15 inch on either side of slide.

10. If testing of valve assembly does not follow immediately, close all ports with BMS 3-11 resistant O-rings and caps or plugs.

11. Materials

    A. BMS 3-11 fire resistant hydraulic fluid -- source optional

    B. MIL-G-23827 grease -- source optional

    C. BMS 10-11, Type I primer -- source optional

    D. MCS 352 Skydrol Assembly Lube -- Monsanto Co., Inc., 800 North Lindbergh Blvd., St. Louis, Missouri

FITS AND CLEARANCES

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

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

			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	
	ID	9							*[1]
	OD	9							

*[1] The maximum allowable clearance is controlled by leakage requirements as stated in TESTING.

1. Deleted.

2. Deleted.

TESTING

1. Test Equipment

NOTE: Equivalent substitutes may be used

A. Test bench capable of delivering graduated hydraulic pressure up to 4500 psi.

B. Test Fixture -- F80232

2. Preparation for Test

A. Install hydraulic fittings (Fig. 1102).

(1) Apply hydraulic fluid BMS 3-11 or Skydrol Assembly Lube MCS 352 to packings (3) and threads of unions (1 and 2) prior to installation.

(2) Place O-ring packing (3) on unions (1 and 2) and install in valve assembly (4).

B. Connect unit with hydraulic source. Cycle unit to bleed all air.

C. Tests shall be conducted with BMS 3-11 hydraulic fluid at 80° to 100°F.

D. Tests shall be conducted in the sequence shown below.

WARNING: DO NOT APPLY COMPRESSED AIR TO PORTS AT ANY TIME. DO NOT CYCLE UNIT AT PROOF PRESSURE.

E. Test shall be conducted with unit installed in Test Fixture -- F80232 or equivalent.

3. Functional Tests

A. Free flow test.

(1) With slide input end (figure 701) at maximum extension from sleeve, apply hydraulic pressure to port "A" and then port "B". Fluid shall flow freely from port "A" through return port and from port "B" through pressure port.

(2) With slide input end at maximum retraction in sleeve, apply hydraulic pressure to port "A" and port "B." Fluid shall flow freely from port "A" through pressure port and from port "B" through return port.

NOTE: In neutral position, end opposite input end of slide is flush with two projections on valve sleeve.

B. Proof pressure test.

WARNING: VALVE SLIDE SHALL NOT BE MOVED WHILE UNDER 4500 PSI PROOF PRESSURE.

(1) With slide displaced 0.06 inch from neutral in either direction and with ports A and B blocked, apply 4500 psi proof pressure to pressure port for period of 2 minutes. Reduce pressure to 2 psi for a period of 2 minutes. Check that there is no damage or external leakage.

(2) Repeat step (1) with slide displaced 0.06 inch in opposite direction. Check that there is no damage or leakage.

(3) Repeat step (1) except apply 1500-psi pressure to return port instead of pressure port.

C. Establish hydraulic null position of valve.

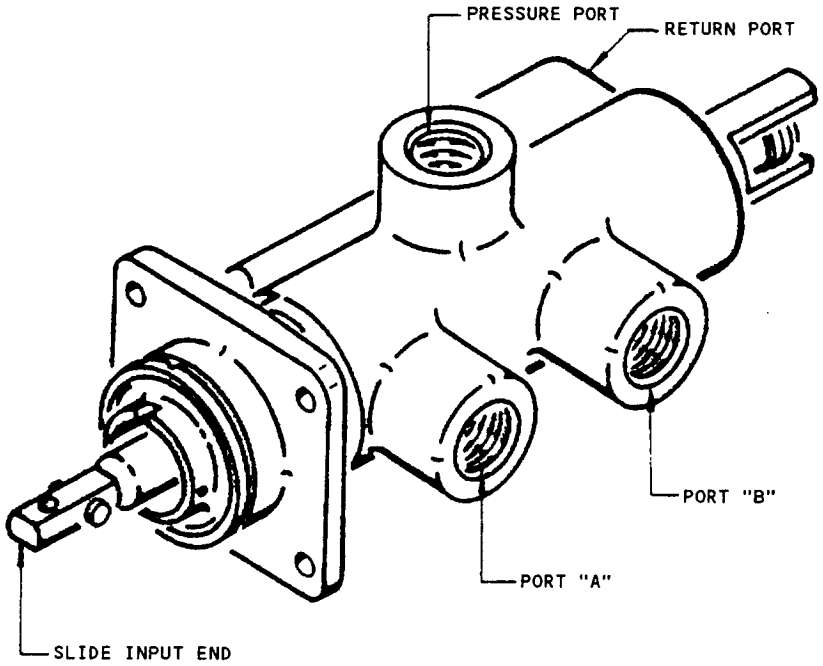
(1) Attach pressure gages to ports A and B.

(2) Apply 3000-psi hydraulic pressure to pressure port.

(3) Extend and retract slide until pressure at ports A and B is equal. Check that the pressure does not exceed the values listed as follows:

(a) 200 psi for overhauled valve.

(b) 1800 psi for in service valve.



Functional Tests
Figure 701

L80984

(4) Check that leakage at return port in null position does not exceed:

(a) 200 cc per minute for overhauled valve.

(b) 8000 cc per minute for in-service valve.

(5) With return port open, apply 3000 psi to pressure port. Very slowly move valve slide ±0.005 from null. Monitor pressure differential between ports A and B. Move slide from position where pressure differential between ports A and B is 1000 psi and decreasing, to position where pressure differential between ports B and A is 1000 psi and decreasing. Slide travel must not exceed 0.002 inch.

D. Leakage Test

(1) With slide input end at maximum extension from sleeve and ports A and B blocked, apply pressure of 3000 psi to pressure port, check that leakage at return port does not exceed 20 cc per minute.

(2) Repeat step (1) with slide input end at maximum retraction. Check that leakage at return port does not exceed 20 cc per minute.

E. Cycling Test

(1) With ports A and B blocked, apply pressure of 3000 psi to pressure port. Operate slide for at least five cycles. Check that there is no binding, rough movement, external leakage, or failure. Check that operating force does not exceed:

(a) 10 lb during last 0.02-inch of travel toward null

(b) 20 lb within 0.65-inch from null in any other mode

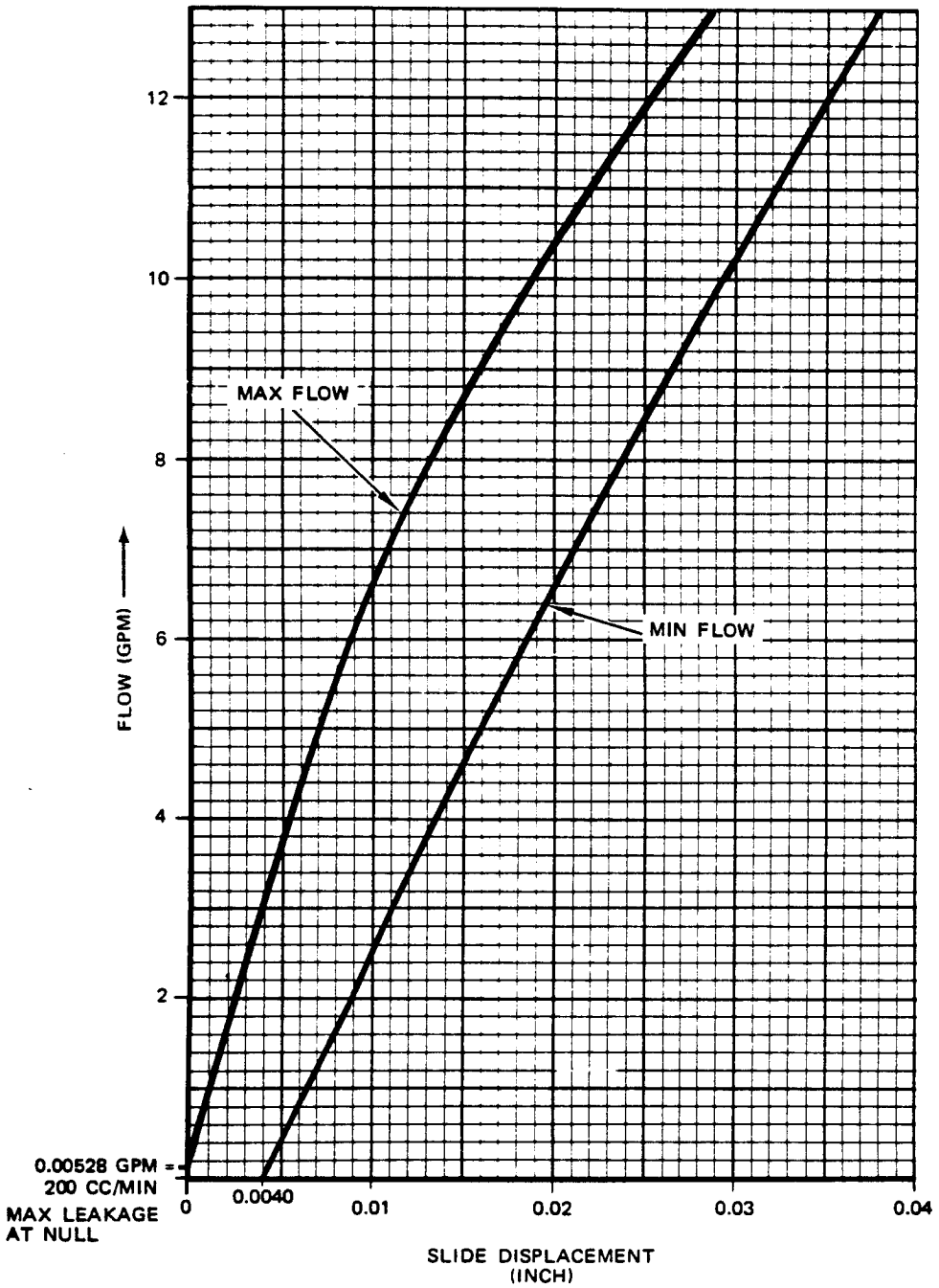
(c) 25 lb in excess of 0.65-inch from null in any other mode

F. Controlled Flow Test

(1) With ports A and B interconnected, apply pressure of 3000 psi to pressure port. Retract slide. Test results must conform to requirements shown on Fig. 702. Graph I applies to overhauled valve. Graph II applies to in-service valve.

(2) Repeat step (1) with slide extended. Test results must conform to requirements shown on Fig. 702.

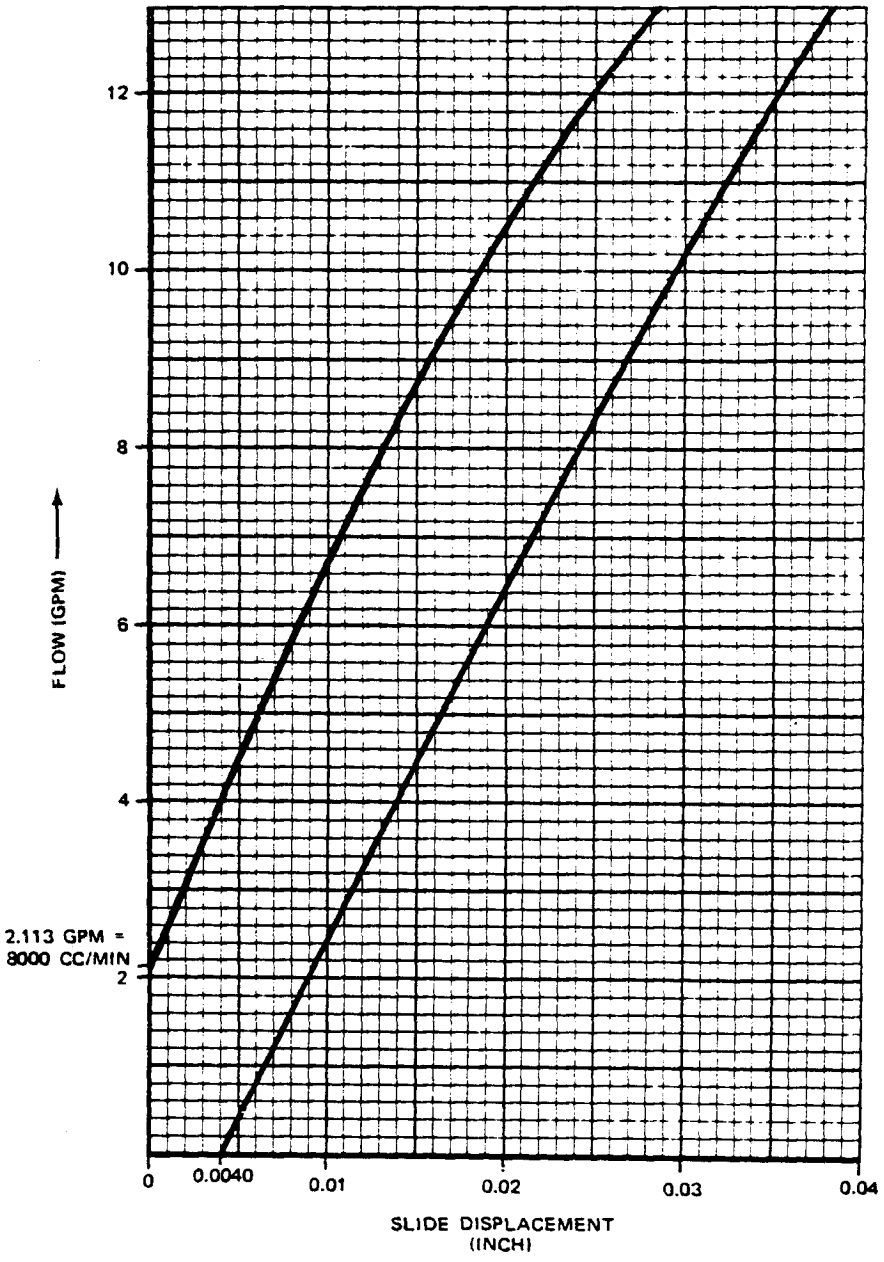
G. After test completion, do not drain hydraulic fluid from valve. Cap or plug all ports with BMS 3-11 resistant packings and plugs or caps.



GRAPH 1

NEW OR OVERHAULED VALVE

Flow-Slide Displacement Diagram
Figure 702 (Sheet 1)



GRAPH II

MAXIMUM IN-SERVICE LIMITS

TROUBLE SHOOTING

1. Trouble during test after overhaul

	Trouble	Possible Cause	Correction
A.	Leakage on slide shaft	Faulty or defective O-ring (6)	Disassemble, inspect, replace
B.	Leakage on end of cylinder bore	Faulty or defective O-ring (7)	Disassemble, inspect, replace
C.	Leakage from ports exceeding allowable limits	Faulty or defective O-rings (7), or faulty or defective lands on slide (11) or passages on sleeve (10)	Disassemble, inspect, repair, or replace

STORAGE INSTRUCTIONS

1. Fill unit partially with BMS 3-11 hydraulic fluid. Cap or plug all ports with BMS 3-11 resistant packings and caps or plugs.

2. Wrap unit in vapor barrier paper. Attach tag with test date and cure date for packings. Tag should carry following information: "This unit contains BMS 3-11 hydraulic fluid."

3. For further information, refer to "Temporary Protective Coatings," Subject 20-44-02.

SPECIAL TOOLS, FIXTURES AND EQUIPMENT

NOTE: Equivalent substitutes may be used.

1. F71290-10 -- Spanner Wrench

2. F80232 -- Test Fixture

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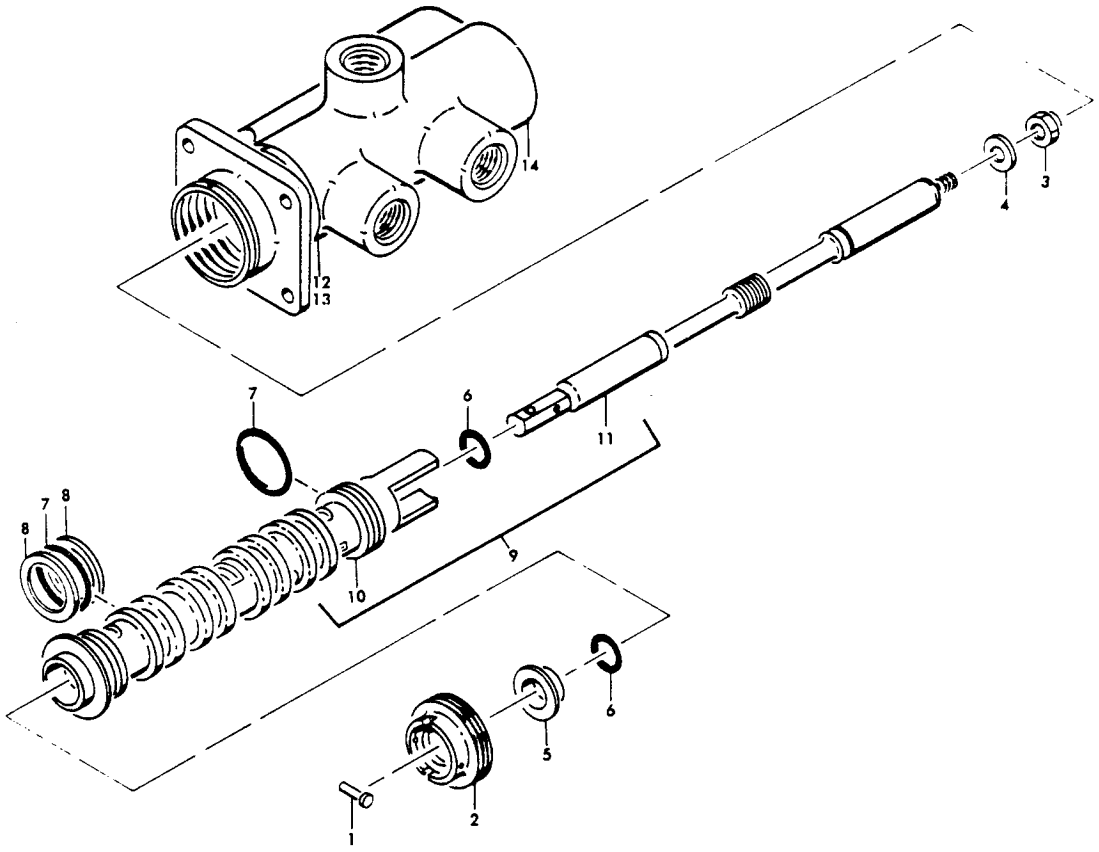
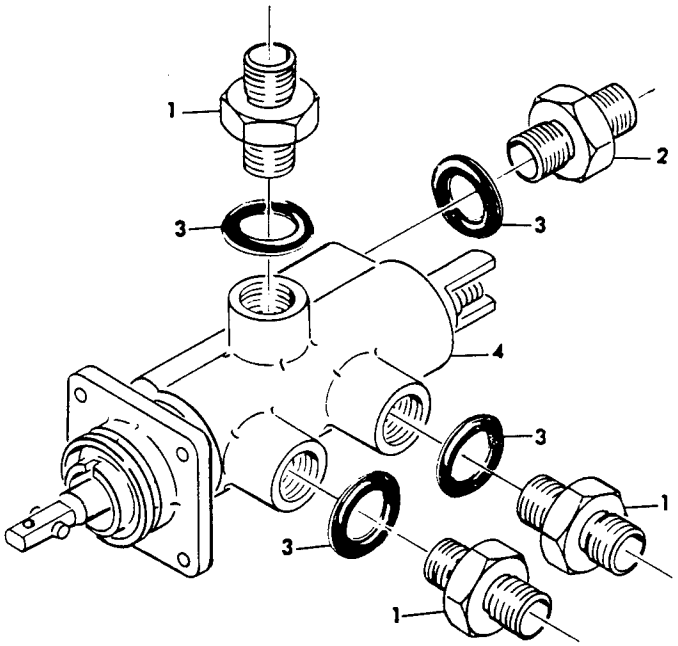
1. Exploded View



Trailing Edge Flap Control Valve 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					
	65-44821-1		TE FLAP CONTROL VALVE ASSY *[1]	A	
	65-44821-2		TE FLAP CONTROL VALVE ASSY *[1]	B	
	65-44821-3		TE FLAP CONTROL VALVE ASSY *[1]	C	
	65-44821-4		TE FLAP CONTROL VALVE ASSY *[1]	D	
1	MS51923-164		. PIN		1
1	66-22838-1		. PIN (opt)		1
2	66-22737-1		. NUT		1
3	BACN10JC3		. NUT (replaces NAS679A3W)		1
4	BACW10P42S		. WASHER		1
5	66-22817-1		. RETAINER		1
6	NAS1611-112		. PACKING		2
7	NAS1611-212		. PACKING		6
8	MS28782-17		. RING		8
9	69-35582-1		. SLIDE ASSY (matched set)		1
10	65-44823-1		. . SLEEVE		1
11	69-35583-1		. . SLIDE		1
12	69-35587-4		. STRAP		1
13	BACN12V1AL		. NAMEPLATE		1
14	65-44822-1		. BODY	AC	1
14	65-44822-3		. BODY	BD	1

*[1] Configuration of -1 is identical to -3, and -2 is identical to -4. Dash numbers are assigned on basis of leakage limits established during testing.



Trailing Edge Flap Control 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					
	65-51602-2		TE FLAP CONTROL VALVE ASSY	A	
	65-51602-29		TE FLAP CONTROL VALVE ASSY	B	
	65-51602-30		TE FLAP CONTROL VALVE ASSY	C	
1	MS21902-8		. UNION		3
2	MS21902D8		. UNION		1
3	NAS1612-8		. PACKING		4
4	65-44821-2		. VALVE ASSY	A	1
4	65-44821-1		. VALVE ASSY (opt)	A	1
4	65-44821-3		. VALVE ASSY	B	1
4	65-44821-4		. VALVE ASSY	C	1