TO: ALL HOLDERS OF TRAILING EDGE FLAPS CONTROL VALVE ASSEMBLY OVERHAUL MANUAL, 27-53-12

REVISION NO. 9, DATED MAR 1/03

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
Replaced the word "slide" with "sleeve" in par. 7.C.(9)(c)								X					
Added P/N BACC45FN10-20P to supercede P/N BACC45FN10-2P item 6 in Fig. 6												X	

TRAILING EDGE FLAPS CONTROL VALVE ASSEMBLY

27-53-12

BOEING P/N 65-44631-1
65-51602-11

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT

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
	27-53-12					
	T-1	Sep 10/70				
	T-2	BLANK				
*	LEP-1	Mar 1/03				
	LEP-2	BLANK				
	T/C-1	Jul 5/83				
	T/C-2	BLANK				
	1	Sep 10/70				
	2	Sep 10/70				
	3	Sep 10/70				
	4	Sep 10/70				
	5	Sep 5/87				
	6	Mar 1/01				
	6A	Jul 5/83				
	6B	BLANK				
	7	Jul 5/83				
	8	Mar 1/01				
*	9	Mar 1/03				
	10	Sep 5/87				
	11	Dec 25/74				
	12	Mar 1/01				
	13	Jul 5/83				
	14	Jul 5/83				
*	15	Mar 1/03				
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	18	BLANK				

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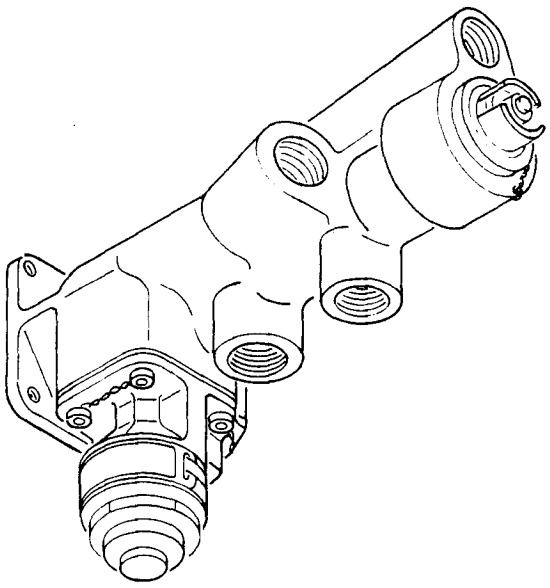
Numerical Parts List Index	None

TE FLAPS CONTROL VALVE ASSEMBLY

Boeing Part Numbers: 65-44631-1 and 65-51602-11



TE Flaps Control Valve Assembly
Figure 1

1. DESCRIPTION AND OPERATION

A. Description

(1) The trailing edge flaps control valve assembly consists of a slide assembly, solenoid valve, electrical connector, plug and wiring. These components are installed in a housing which has a hydraulic pressure supply port, a return port and two hydraulic supply control ports.

B. Operation

(1) Movement of the slide out of neutral position connects the pressure supply port with one control port, and the second control port with the return port.

(2) When the solenoid valve is energized, pressure port and cylinder port of the solenoid valve are connected.

(3) When the solenoid valve is de-energized, return port and cylinder port of the solenoid valve are connected.

(4) Special instructions for storage are not required. Standard aircraft shop practices are sufficient.

C. Leading Particulars

Length (overall) -- 11.5 inches
Height (overall) -- 6 inches
Width (overall) -- 4.25 inches
Weight -- 2.9 pounds

2. DISASSEMBLY

A. Standard aircraft shop practices are sufficient for disassembly of this unit. (See figures 6 and 7.)

CAUTION: SLIDE ASSEMBLY (26) CONSISTS OF PRECISION PARTS. KEEP PARTS TOGETHER AT ALL TIMES AS A MATCHED SET. AVOID ALL UNNECESSARY HANDLING. PARTS MUST BE PROTECTED AT ALL TIMES WHEN NOT IN WORK BY PLACING IN AN ADEQUATE CONTAINER.

TAKE EXTREME CARE WHILE REMOVING CHANNEL SEALS (18) AND PACKINGS (19) NOT TO MAR GROOVES.

NOTE: Do not remove parts (5 through 11, 25 and 38) unless repair or replacement is necessary.

3. CLEANING

A. Standard aircraft shop practices are sufficient for cleaning components of this unit. (See figures 6 and 7.)

NOTE: Prior to cleaning housing assembly (37), mask off plug (8) and connector (6).

4. INSPECTION/CHECK

A. Visual Checks

(1) Examine all metal parts for pits, burrs, scratches, cracks, corrosion and any other damage using strong light and a minimum of 10-power magnification.

(2) Examine all threads for stripping and cross-threading.

(3) Examine all painted, coated and plated surfaces for blisters, flaking and wear.

B. Special Checks (See figure 6.)

(1) If visual examination discloses evidence of defects in any of parts listed, perform the following checks:

(a) Fluorescent dye penetrant check -- nuts (12 and 29), bushing (13), plug (16), retainers (17 and 30), housing (39).

(b) Magnetic particle check -- sleeve (27), slide (28).

(2) Check solenoid valve (2) according to vendor's overhaul instructions.

(3) Check slide assembly (26).

(a) Lubricate sleeve (27) and slide (28) with BMS 3-11 hydraulic fluid.

(b) Turn assembly on end. Slide must move by its own weight at each of three positions, approximately 120 degrees apart with respect to the sleeve.

(4) Check nameplate (36) for legibility.

5. REPAIR

A. Repair (See figure 6.)

(1) Remove corrosion and minor defects from metal parts by polishing lightly with aluminum oxide abrasive cloth, 220 grit or finer.

(2) Clean up minor thread defects with a key file or thread chaser.

(3) Refinish polished areas as required for corrosion protection.

CAUTION: DO NOT POLISH OR BUFF ANY SURFACE OF SLEEVE (27) OR SLIDE (28) AT ANY TIME.

B. Refinish (See figure 6.)

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

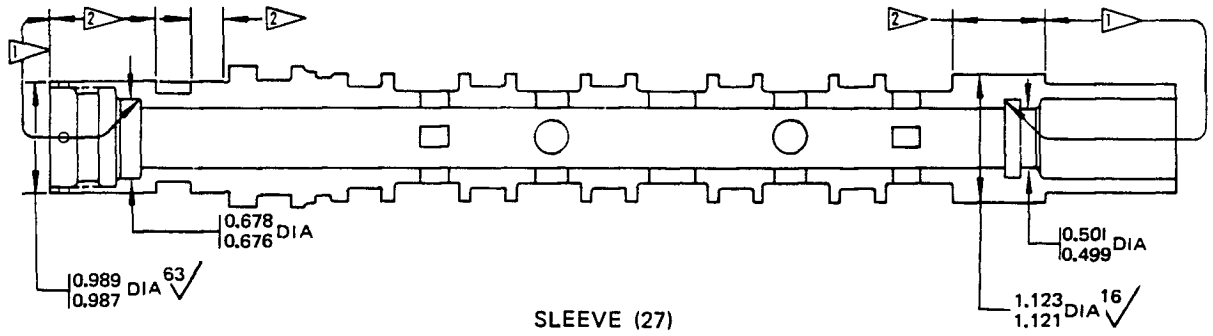
(1) If painted, coated or plated surfaces are worn or chipped, refinish the following parts as indicated:

(a) Nut (12, 29), Plug (16), Housing (39) -- Apply F-2.26 all over.

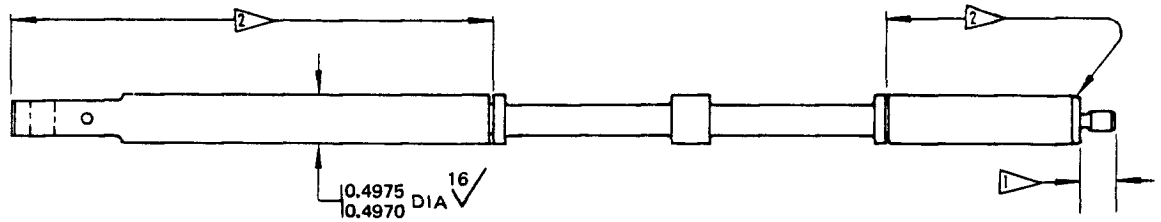
(b) Bushing (13) -- Apply F-4.201 all over except tapered end.

(c) Retainers (17 and 30) -- Apply F-4.201, 0.0003 to 0.0005 inch thick, to outside surfaces except smaller face.

(d) Sleeve (27), Slide (28) -- See figure 2.



SLEEVE (27)



SLIDE (28)

1 F-1.1923, 0.0003-0.0005 THICK
2 F-1.842, 0.003-0.005 THICK
NOTE: DIMENSIONS ARE IN INCHES

C. Replacement (Fig. 6)

(1) Replace all seals, packings, gasket (4), and backup rings at each overhaul.

(2) Replace parts damaged beyond simple repair.

(3) Sleeve (27) or slide (28) -- Replace entire slide assembly (26) as a matched set if worn or damaged beyond repair.

(4) Inserts (38) -- Install new insert with BMS 10-11, type 1, primer. Insert should be 1/4 to 1/2 turn below surface. Remove tang.

(5) Wires (9 and 10) -- Install new wires per Fig. 2A and 20-11-02 and tubings (3) per 20-11-03.

(a) Prior to installation of connector (6) and plug (8) in housing (39), clean cavity in housing using standard shop practices.

(b) Install connector and plug in housing. Fill cavity with potting compound as follows:

1) Blend Silastic RTV 3110 rubber (Dow Corning Corp., Midland, Michigan)

a) Mix 4 parts catalyst 3110 with 100 parts Silastic RTV 3110 rubber.

b) Weigh components within $\pm$ 2% of the proportions specified.

c) Use clean container, mixer and other equipment.

d) Mix in original container, or in clean, dry container made of glass, metal, polyethylene, or teflon.

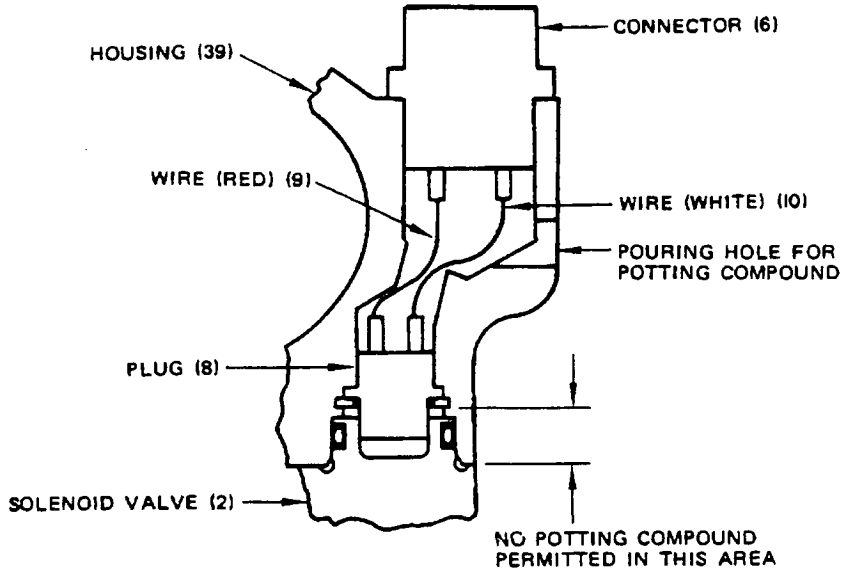
e) When hand mixing, use a stirrer, such as a metal spatula. Usually 7 to 8 minutes of hand mixing is required for a smooth mix. Use long, smooth strokes to prevent air bubbles. To tell complete mixing, spread a small amount of mix thinly on white paper. Even coloring shows complete mixing.

2) Deaerate blended compound with a vacuum of at least 25 inches of mercury, until foaming slows to a gentle boil. Release vacuum to collapse excess foam. Keep temperature above dew point.

3) Slowly pour compound through bore in housing (39, Fig. 2.A). Position housing so that air may escape through bore.

4) Pot life is approximately 1/2 hour at 77°F. Cavity must be filled without any voids. Excess compound must be wiped flush with outer surface of housing.

5) Cure 24 hours at room temperature until material is set up, or 5 hours at 100°F, or 45 minutes at 150°F.



ITEM NUMBERS APPLY TO FIG. 6

Connector and Solenoid Valve Installation
Figure 2A

6. ASSEMBLY

A. Standard aircraft shop practices are sufficient for assembly of this unit (Fig. 6 and 7).

CAUTION: TAKE EXTREME CARE WHILE INSTALLING CHANNEL SEALS (18) AND PACKINGS (19) ON SLEEVE (27) PER 20-50-06, AND WHILE SLIDING SLEEVE ASSEMBLY (26) INTO CYLINDER BORE OF HOUSING.

NOTE: Prior to assembly, lightly lubricate all packings, seals and threaded fittings with BMS 3-11 hydraulic fluid.

Tighten bolts (1) to 25-35 lb-in., nuts (12 and 29) to 50-60 lb-in., and plug (16) within 20-30 lb-in.

Lockwire bolts (1) and screws (5) by pairs, nuts (12 and 29) to housing (39), and plug (16) to sleeve (27).

7. TESTING

A. Test Equipment

(1) Hydraulic test bench capable of delivering hydraulic pressure to 4500 psi.

(2) Pressure gages with 3000 psi scale.

(3) Spring scales up to 10 pounds.

(4) Ohmmeter with 100-megohm minimum scale.

(5) Megger wwith 1500-volt dc output.

(6) Test Fixture -- F80232

B. Preparation for Test

(1) Install packings and unions per figure 7 using BMS 3-11 hydraulic fluid as lubricant.

(2) Connect pressure port of unit with hydraulic fluid source. Cycle unit to bleed all air.

(3) Tests shall be conducted with BMS 3-11 hydraulic fluid.

(4) Test shall be conducted in the sequence shown below with solenoid valve de-energized unless noted otherwise.

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

(5) Test shall be conducted with unit installed in Test Fixture -- F80232.

C. Functional Tests

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

(1) Free flow test.

(a) With slide input end 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.

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

(2) Proof pressure test.

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

(a) Apply 3000 psi hydraulic pressure to pressure port and energize solenoid valve with 28 volts dc. With slide displaced 0.06 inch from neutral in either direction and with ports "A" and "B" blocked, apply 4500 psi pressure to pressure port for a period of 2 minutes. Reduce pressure to 2 psi for a period of 2 minutes.

(b) De-energize solenoid valve and repeat step (a) with slide displaced 0.06 inch in opposite direction from neutral.

(c) With slide displaced 0.06 inch from neutral in either direction and ports A and B plugged, apply 1500-psi hydraulic pressure to return port for 2-minute period. Reduce pressure to 2 psi for 2 minutes.

(d) On the end of proof pressure test, there shall be no evidence of damage or external leakage.

(3) Establish hydraulic null position of valve.

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

(b) Apply 3000-psi hydraulic pressure to pressure port with return port open.

(c) 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:

1) 200 psi for overhauled valve.

2) 1800 psi for in service valve.

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

1) 200 cc per minute for overhauled valve.

2) 8000 cc per minute for in-service valve.

(e) 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.

(4) Leakage test.

(a) With slide input end at maximum extension and ports A and B blocked, apply 3000-psi hydraulic pressure to pressure port. Leakage at return port shall not exceed 5 cc per minute.

(b) Repeat step (a) with slide input end at maximum retraction. Leakage at return port shall not exceed 5 cc per minute.

(5) Cycling test.

(a) With ports A and B blocked, apply 3000-psi hydraulic pressure to pressure port.

(b Operate slide for at least 5 cycles. There shall be no evidence of binding, rough movement, external leakage or failure. Check that operating force does not exceed:

1) 10 lb during last 0.02-inch of travel toward null

2) 20 lb within 0.65-inch from null in any other mode

3) 25 lb in excess of 0.65-inch from null in any other mode

(c) Deleted

(6) Flow - slide displacement test.

(a) With ports A and B interconnected, apply 3000-psi hydraulic pressure to pressure port. Retract slide. Flow shall conform to requirements shown on Fig. 5. Graph I applies to overhauled valve and Graph II applies to in-service valve.

(b) Repeat step (a) with slide displaced in opposite direction.

(7) Dielectric Strength (Fig. 5A)

CAUTION: EXCESSIVE PERIODS OF TESTING WILL DAMAGE INSULATION. DAMAGE IS CUMULATIVE WITH SUCCESSIVE TESTS.

(a) Apply 1500 volts ac, at 250-500 volts per second, between pins 1 and 2 of connector (6, Fig. 6) and valve body. Hold voltage for 1 minute. There must be no arcing or breakdown of insulation. Reduce voltage to zero before removing connections.

(8) Insulation Resistance Test (Fig. 5A)

(a) Using megger, measure insulation resistance with 500 volts dc applied between pins 1 and 2 of connector (6, Fig. 6) and valve body. Insulation resistance must be:

1) 100 megohms minimum for overhauled unit

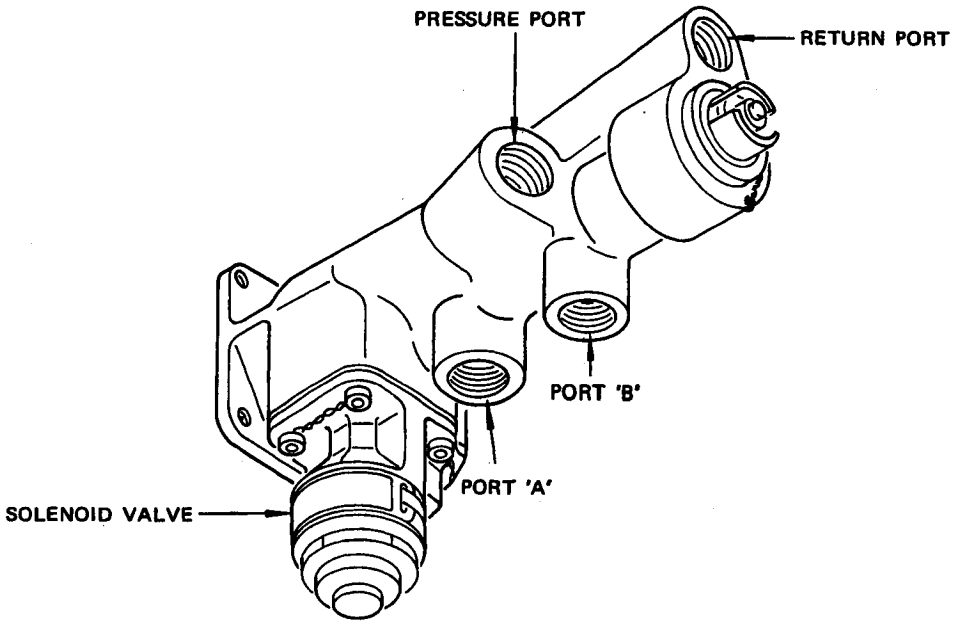
2) 10 megohms minimum for unit in service

(9) Solenoid valve test.

(a) Cap ports A and B. Apply 1500-psi hydraulic pressure to pressure port. Place slide in neutral position and retain.

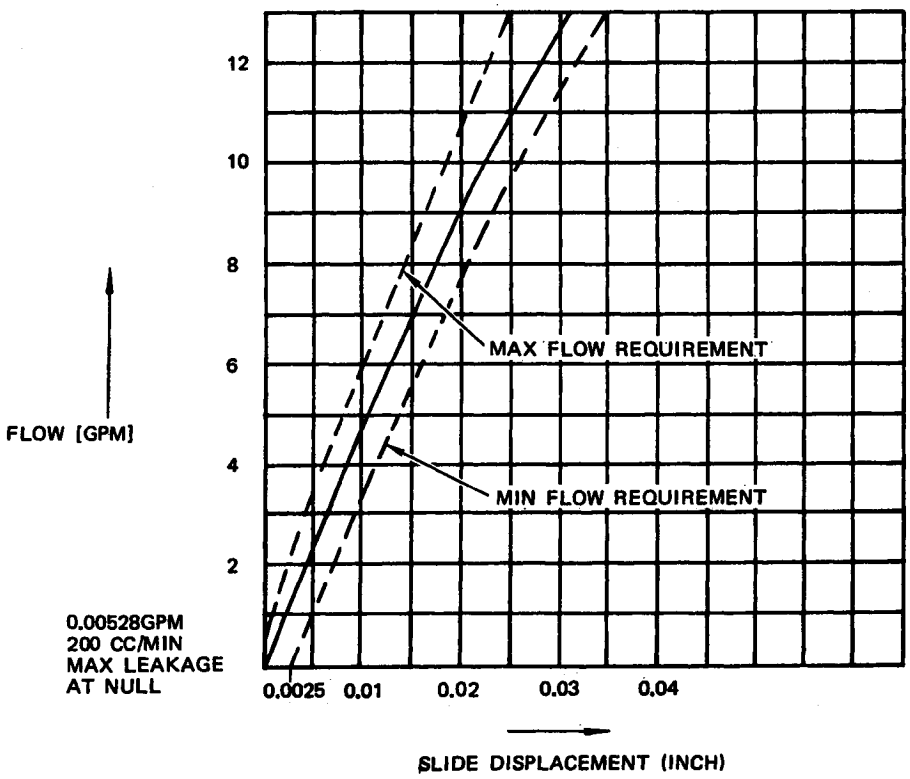
(b) Energize solenoid valve with 28 volts dc. Move slide until neutral position is obtained. Slide travel shall be 0.08 to 0.09 inch.

(c) De-energize solenoid. Sleeve shall return to initial position.



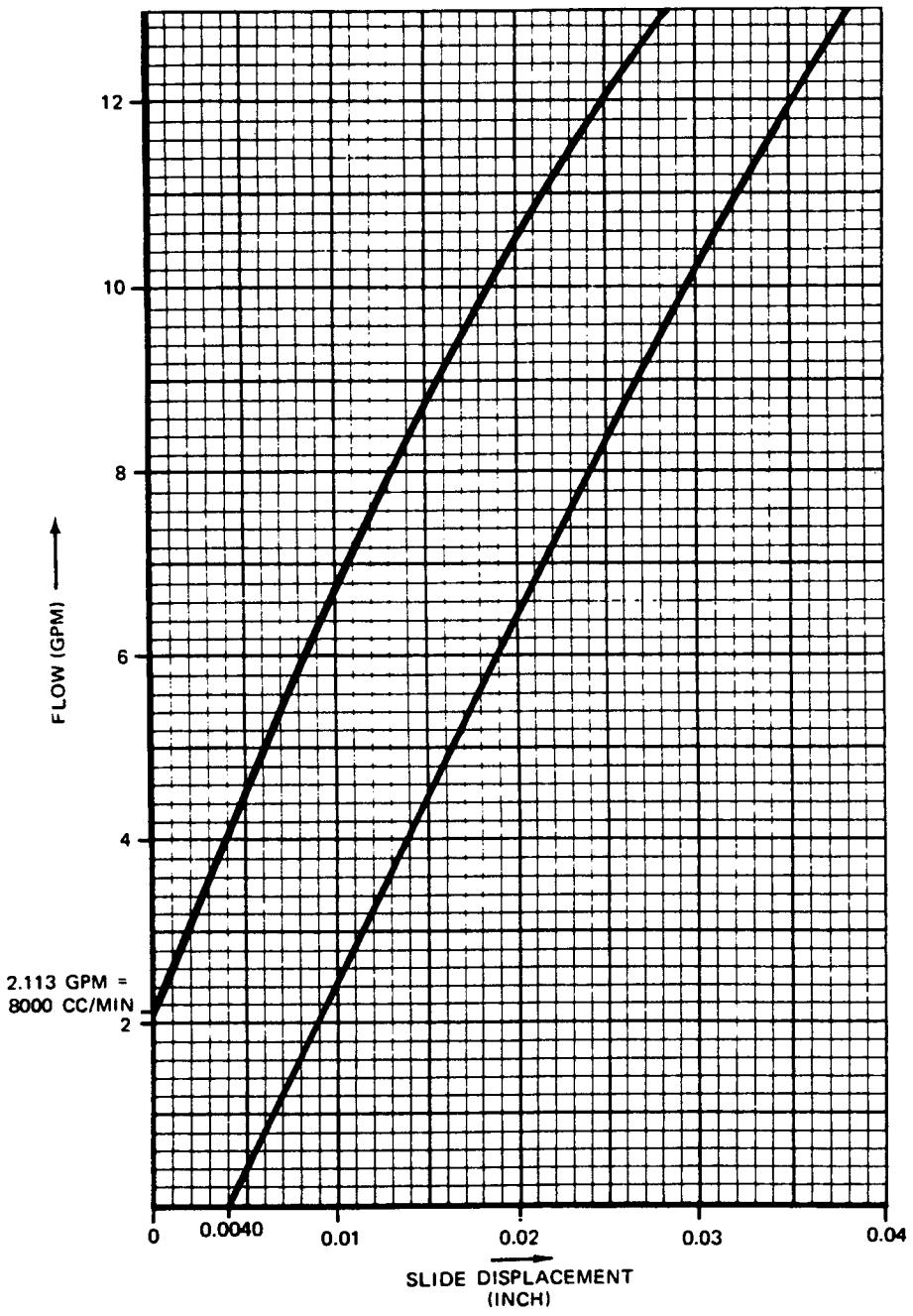
Functional Tests
Figure 3

Figure 4 - Deleted



GRAPH I
NEW OR OVERHAULED VALVE

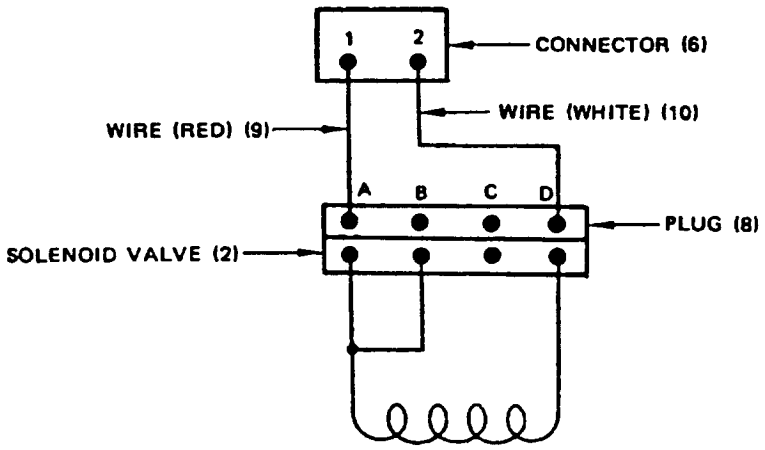
Flow - Slide Displacement Diagram
Figure 5 (Sheet 1)



GRAPH II

LIMITS FOR IN-SERVICE VALVE

Flow-Slide Displacement Diagram
Figure 5 (Sheet 2)



ITEM NUMBERS APPLY
TO FIG. 6

Electrical Diagram
Figure 5A

8. TROUBLE SHOOTING

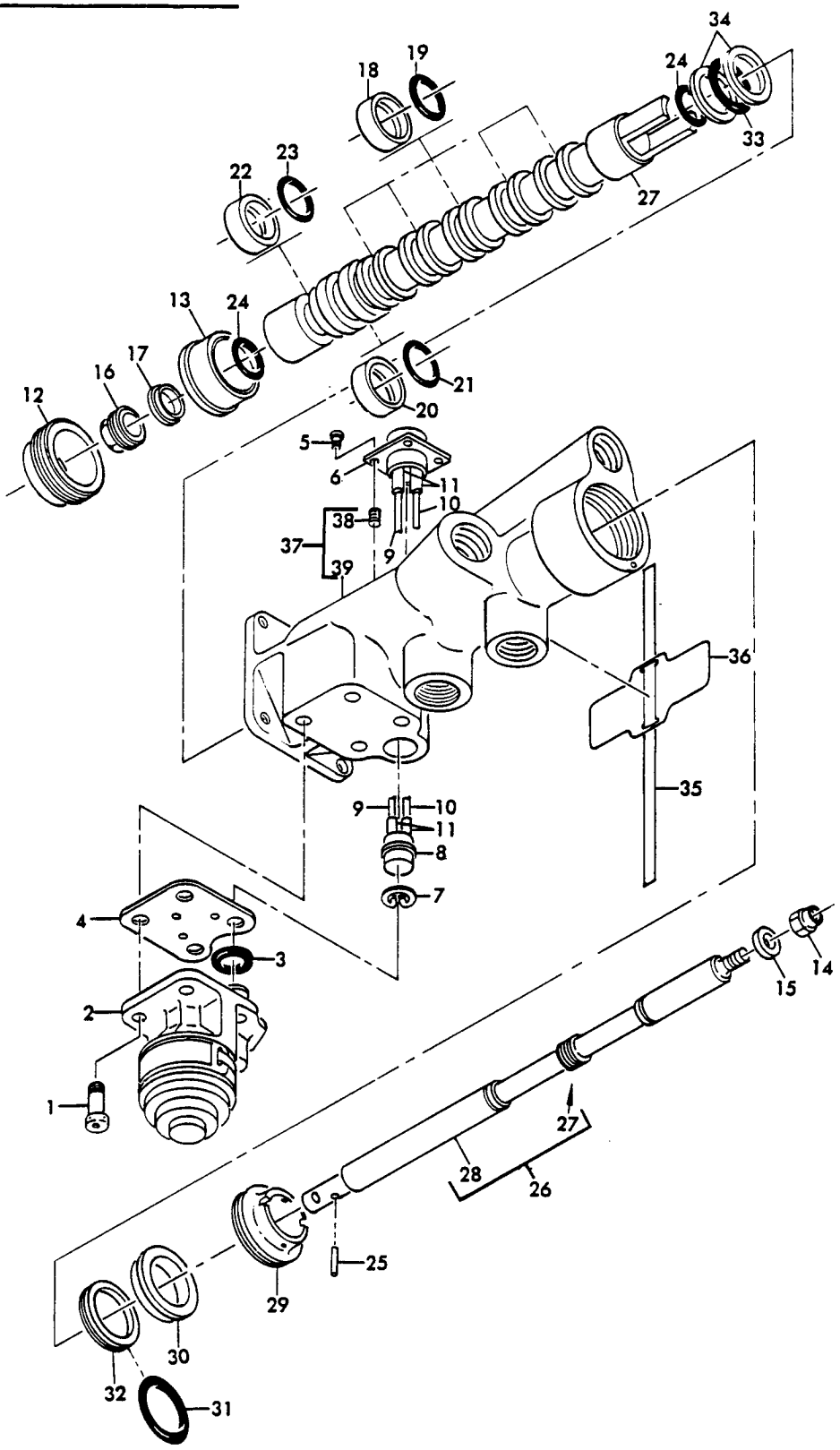
A. Trouble during test after overhaul (Fig. 6.).

	Trouble	Possible Cause	Correction
(1)	Leakage on either end of slide (28)	Defective packing (24)	Disassemble, check, replace
(2)	Leakage on either end of cylinder bore	Defective packing (23, 31 or 33); defective ring cap (32); defective channel seal (22)	Disassemble, check, replace
(3)	Leakage from ports exceeding allowable limits	Defective packings (19 or 21); defective channel seals (18 or 20); defective lands of slide (28); defective passages of sleeve (27)	Disassemble, check, replace
(4)	Force to move slide (28) exceeds allowable limit	Contamination between sleeve (27) and slide (28)	Disassemble, check, clean

9. SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

A. Test Fixture -- F80232

10. ILLUSTRATED PARTS LIST



TE Flaps Control Valve Assembly
Figure 6

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
6-					
	65-44631-1		TE FLAPS CONTROL VALVE ASSEMBLY		
1	NAS1351-4H10P		. BOLT		4
2	59600-5003		. VALVE, SOLENOID, V92003 (BOEING10-60811-1)(OPT)		1
2	59600-5007		. VALVE, SOLENOID, V92003 (BOEING 10-60811-3)(OPT)		1
2	45080-1		. VALVE, SOLENOID, V99643 (BOEING 10-60811-8)(PREF)		1
2	59600-5011		. VALVE, SOLENOID, V92003 (BOEING 10-60811-9)(OPT)		1
2	45080		. VALVE, SOLENOID, V99643 (BOEING 10-60811-3)(OPT)		1
2	881600-1001		. VALVE, SOLENOID, V92003 (BOEING 10-60811-13)(OPT)		1
3	NAS1611-112		. PACKING, O-RING		1
4	69-20184-1		. GASKET		1
5	AN500AD4-4		. SCREW		4
6	BACC45FN10-2P		. CONNECTOR, ELECTRICAL (SUPSD BY BACC45FN10-20P)		1
6	BACC45FN10-20P		. CONNECTOR, ELECTRICAL (SUPSDS BACC45FN10-2P)		1
7	UR50		. RING, SNAP, V80756		1
8	000100-0113		. PLUG, ELECTRICAL, V05574		1
8	AS203-20001		. PLUG, ELECTRICAL, V21183 (OPT)		1
9	65-44631-2		. WIRE, RED		1
10	65-44631-3		. WIRE, WHITE		1
11	65-44631-4		. TUBING		4
12	69-54635-1		. NUT		1
13	69-54636-1		. BUSHING		1
14	BACN10GW3		. NUT, SELF-LOCKING		1
15	BACW10P42S		. WASHER		1
16	69-54630-1		. PLUG		1
17	69-54629-1		. RETAINER, SEAL		1
18	69-54540-212		. SEAL, CHANNEL		5
19	NAS1611-212		. PACKING, O-RING		5
20	69-54540-214		. SEAL, CHANNEL		1
21	NAS1611-214		. PACKING, O-RING		1
22	69-54540-210		. SEAL, CHANNEL		1
23	NAS1611-210		. PACKING, O-RING		1
24	NAS1611-112		. PACKING, O-RING		2
25	MS51923-164		. PIN		1
26	69-54631-1		. SLIDE ASSEMBLY (MATCHED SET)		1
27	65-44634-1		. . SLEEVE		1
28	69-54632-1		. . SLIDE		1
29	69-54633-1		. NUT		1
30	69-54634-1		. RETAINER, SEAL		1
31	NAS1611-216		. PACKING, O-RING		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
6-					
32	BACR12BJ216		. CAP, RING		1
33	NAS1611-219		. PACKING, O-RING		1
34	MS28782-24		. RING, BACKUP		2
35	69-35587-6		. STRAP		1
36	BAC27DHY149		. NAMEPLATE		1
37	65-44632-1		. HOUSING ASSEMBLY		1
37	65-44633-1		. HOUSING ASSEMBLY (OPT TO 65-44632-1)		1
38	MS21209F4-15		. . INSERT, SCREW THREAD		4
39	65-44632-2		. . HOUSING (USED ON 65-44632-1)		1
39	65-44633-2		. . HOUSING (USED ON 65-44633-1)		1

VENDORS

V05574 VIKING INDUSTRIES INC., 21001 NORDHOFF, CHATSWORTH, CALIFORNIA 91311

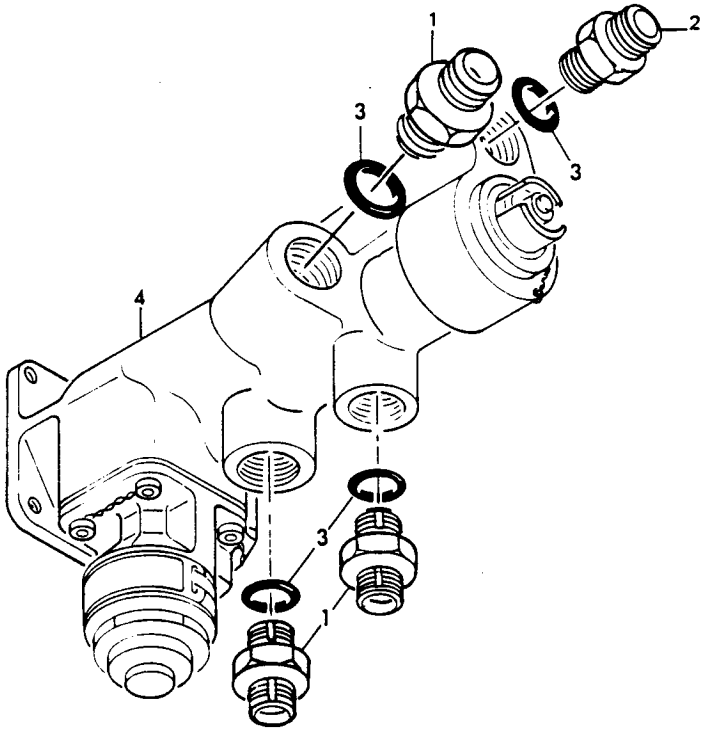
V21183 ASTRO SEAL INC., 9452 RUSH STREET, SOUTH EL MONTE, CALIFORNIA 91733-1535

V80756 SPIROLOX, DIVISION OF KAYDON CORP., 29 CASSENS CT, ST. LOUIS, MISSOURI 63026-2542
FORMERLY RAMSEY CORP.

V92003 PARKER-HANNIFIN CORP., 18321 JAMBOREE BLVD., P.O. BOX C-19510, IRVINE, CALIFORNIA 92713

V99643 STERER ENGINEERING AND MANUFACTURING CO., 4690 COLORADO BLVD., P.O. BOX 39787, GRIFFITH STATION, LOS ANGELES, CALIFORNIA

C. Exploded View



TE Flaps Control Valve Assembly
Figure 7

D. Group Assembly Parts List

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
7-	65-51602-11		TE FLAPS CONTROL VALVE ASSEMBLY		
1	MS21902-8		. UNION		3
2	MS21902D8		. UNION		1
3	NAS1612-8		. PACKING, O-ring		4
4	65-44631-1		. VALVE ASSEMBLY, TE flaps control. .		1