TO: ALL HOLDERS OF RUDDER POWER CONTROL UNIT ASSEMBLY OVERHAUL MANUAL, 27-20-01

REVISION NO. 57, DATED JUL 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
Added PRR 35436-R, SB 27-1252 and SB 27-1255 information, rudder PCU, P/N 65-45160 replaced with vendor PCU, P/N 419200-1003 (V92003)												X	

RUDDER POWER CONTROL UNIT ASSEMBLY

27-20-01

BOEING P/N 65-44861-2 thru -12
65-45160-3 thru -6, -8, -12, -13, -15, -17, -19, -21
65C37052-2 thru -10
65C37053-2 thru -10

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30222	Feb 15/68
		PRR 30651	Feb 15/68
27-1063		PRR 32279	Dec 25/73
		PRR 32293	Jun 25/74
27-1064		PRR 32278	Jun 25/74
		PRR 32278	Jun 25/74
		PRR 32337	Sep 25/74
	27-2		Jan 5/79
27-1091			Jul 5/79
		PRR 33470-1	Dec 5/84
		PRR 33687	Dec 5/84
		PRR 33755	Jun 5/85
22-1069			Mar 5/86
27-1127			Mar 5/86
22-1074			Jun 5/86
		PRR 34129	Dec 5/86
27-1145			Jun 5/88
27-1145R1			Dec 5/88
27-1185	27-26	PRR 35153	Jun 5/93
27-1185R1			Dec 1/94
	27-29		Sep 1/95
	27-30		Dec 1/95
27A1202R2	27-31	PRR 35365	Dec 1/97
27A1202R3	27-34		Dec 1/97
27A1221R1			Jul 1/99
27-1252		PRR 35436-R	Jul 1/03
27-1255		PRR 35436-R	Jul 1/03

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
	27-20-01		402H	Jun 5/92	516	Dec 1/97
*	T-1	Jul 1/03	403	Jun 25/74	517	Feb 15/68
	T-2	BLANK	404	Mar 1/96	518	Feb 15/68
*	LEP-1	Jul 1/03	404A	Mar 1/96	519	Sep 25/74
*	LEP-2	Jul 1/03	404B	Mar 1/96	520	Sep 25/74
	T/C-1	Sep 25/74	404C	Mar 5/88	601	Feb 15/68
	T/C-2	BLANK	404D	Mar 5/88	602	Mar 1/98
	1	Sep 25/74	404E	Mar 1/96	603	Jun 1/94
	2	Sep 25/74	404F	Jun 5/93	604	Mar 1/98
	3	Sep 25/74	405	Jun 5/93	701	Sep 25/74
	4	Sep 25/74	406	Jun 5/85	702	Jun 25/75
	5	Sep 25/74	407	Feb 15/68	703	Dec 1/97
	6	Nov 1/01	408	Dec 5/83	704	Dec 10/70
	7	Nov 1/01	409	Sep 5/92	705	Sep 25/74
	8	BLANK	410	Sep 5/92	706	Mar 25/75
	101	Mar 1/99	410A	Dec 5/86	707	Mar 25/75
	102	Mar 1/99	410B	Mar 5/87	708	Dec 10/70
	103	Dec 1/97	411	Mar 5/91	709	Dec 10/70
	104	Dec 1/97	412	BLANK	710	Feb 15/68
	105	Dec 1/97	412A	Mar 5/91	711	Sep 5/92
	106	Dec 1/97	412B	BLANK	712	Mar 10/72
	201	Dec 5/83	413	Sep 1/97	713	Mar 10/72
	202	BLANK	414	Mar 1/96	714	Mar 1/96
	301	Aug 15/68	415	Mar 1/96	715	Mar 1/96
	302	Feb 15/68	416	Mar 1/96	716	Mar 1/96
	303	Feb 15/68	417	Mar 1/96	717	Mar 1/96
	304	May 15/69	418	BLANK	718	Mar 1/96
	305	Dec 1/97	501	Nov 10/69	719	Mar 1/96
	306	Jul 1/99	502	Sep 25/74	720	Mar 1/96
	306A	Jul 1/99	503	Mar 25/74	721	Mar 1/96
	306B	BLANK	504	Dec 1/97	722	Mar 1/96
	307	Jul 1/99	505	Dec 1/97	723	Mar 1/96
	308	BLANK	506	Mar 1/96	724	Mar 1/96
	401	Dec 5/89	507	Dec 1/97	725	Mar 1/96
	402	Jun 5/92	508	Dec 1/97	726	Mar 1/96
	402A	Sep 1/94	509	Mar 1/96	727	Jun 25/73
	402B	Jul 1/02	510	Mar 1/01	728	Jun 25/74
	402B1	Mar 1/96	511	Mar 1/96	729	Jun 25/73
	402B2	BLANK	512	Dec 1/97	730	Jun 25/73
	402C	Jun 5/85	512A	Nov 1/02	731	Jun 1/95
	402D	Jun 5/85	512B	BLANK	732	Jul 1/99
	402E	Jun 5/85	513	Mar 1/96	732A	Jul 1/99
	402F	Jun 5/85	514	Mar 1/96	732B	Jul 1/99
	402G	Jun 5/92	515	Jun 5/85	732C	Jul 1/99

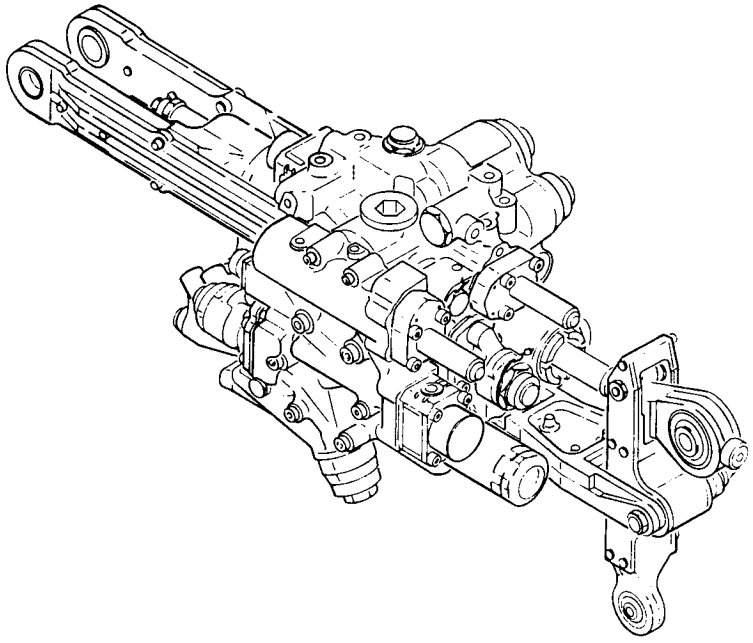
LIST OF EFFECTIVE PAGES

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

PAGE	DATE	PAGE	DATE	PAGE	DATE
27-20-01 (Cont)		807	Dec 1/97	1114A	Mar 5/88
732D	Jul 1/99	808	Dec 1/97	1114B	Dec 5/84
732E	Jul 1/99	901	Feb 15/68	1115	BLANK
732F	Jul 1/99	902	BLANK	1116	Dec 5/83
732G	Jul 1/99	1001	Sep 5/88	1117	Dec 1/97
732H	Jul 1/99	1002	Jul 1/99	1118	Mar 1/98
732I	Jul 1/99	1003	Jul 1/99	1118A	BLANK
732J	BLANK	1004	Dec 5/83	1118B	Jun 5/93
733	Jul 5/79	1005	Jun 5/87	1119	Dec 5/84
734	Jun 25/73	1006	Dec 1/97	1120	Dec 1/97
735	Jul 5/79	1007	Dec 5/83	1120A	Dec 1/97
736	Dec 1/97	1008	Sep 5/88	1120B	BLANK
736A	Jun 5/93	1101	Dec 1/97	1121	Dec 1/97
736B	Jun 5/93	1102	Feb 15/68	1122	Feb 15/68
737	Dec 1/97	1103	Dec 1/97	1122A	Sep 1/95
738	Dec 1/97	1104	Dec 1/97	1122B	Mar 5/87
739	Jun 5/93	1104A	Dec 1/97	1123	BLANK
740	Jun 5/93	1104B	Dec 1/97	1124	Feb 15/68
741	Jun 5/93	1104C	Dec 1/97	1125	Dec 5/88
742	Dec 1/97	1104D	Dec 1/97	1126	Dec 1/97
743	Dec 1/97	1104E	Dec 1/97	* 1127	Jul 1/03
744	Jun 5/93	1104F	Dec 1/97	1128	Dec 1/97
745	Dec 1/97	1104G	Dec 1/97	* 1128A	Jul 1/03
746	Dec 1/97	1104H	Dec 1/97	1128B	BLANK
746A	Dec 1/97	1104I	Dec 1/97	1129	Dec 1/97
746B	BLANK	1104J	Dec 1/97	1130	Dec 1/97
747	Dec 1/97	1104K	Dec 1/97	1131	Dec 1/97
748	Dec 1/97	1104L	BLANK	1132	Dec 1/97
748A	Dec 1/97	1105	BLANK	1133	Dec 1/97
748B	Jun 5/93	1106	Feb 15/68	1134	Dec 1/97
749	Dec 1/97	1107	Mar 5/91	1135	Dec 1/97
750	Dec 1/97	1108	Jun 5/85	1136	Dec 1/97
751	Mar 1/98	1108A	Mar 5/91	1137	Dec 1/97
752	Dec 1/97	1108B	Mar 5/91	1138	BLANK
753	Dec 1/97	1108C	BLANK		
754	Dec 1/97	1108D	Mar 5/91		
755	Jun 5/93	1109	Dec 1/94		
756	Jun 5/93	1110	Dec 1/94		
801	Dec 1/97	1110A	Dec 1/94		
802	Dec 1/97	1110B	Mar 1/98		
803	Dec 1/97	1111	BLANK		
804	Mar 1/01	1112	Mar 5/87		
805	Jul 1/99	1113	Mar 5/87		
806	Jul 1/99	1114	Dec 5/83		

TABLE OF CONTENTS

RUDDER POWER CONTROL UNIT ASSEMBLY



Rudder Power Control Unit Assembly
Figure 1

DESCRIPTION AND OPERATION

1. Description

   A. The Rudder Power Control Unit Assembly is composed of a forward, an aft and an auxiliary manifold assembly, an actuating cylinder assembly and a feed-back linkage combined in one package. On some units the auxiliary manifold assembly is replaced with a cover assembly.

   B. It has two hydraulic systems, A and B, designed to act simultaneously or alone, providing full control to the airplane rudder.

   C. The forward and aft manifold assemblies contain the pistons and snubbing rings of actuating cylinder assembly. The forward manifold assembly terminates in a clevis, for support mounting. The piston rod, extending from aft manifold assembly, terminates in a rod end containing an antifriction bearing.

D. Associated with forward manifold assembly is a main filter, a bypass valve, and a flow control plug or a thermostat valve.

E. Associated with aft manifold assembly are the yaw damper actuating assembly, hydraulic solenoid control valve, electrohydraulic servo valve, dual servo valve, internal summing levers and cranks, bypass valve, flow control plug or a thermostat valve, main filter, secondary filter, and an electrical receptacle, plugs and related wiring.

F. Associated with auxiliary manifold assembly are the yaw damper actuating assembly, hydraulic solenoid control valve, electrohydraulic servo valve, secondary filter, and electrical receptacle, plugs and related wiring.

G. The cover assembly, optional to the auxiliary manifold assembly and associated items, is composed of a wiring assembly and coverplate, and supports the associated walking beam retainer assembly.

H. A walking beam assembly connects internal summing levers to yaw damper assemblies. An exterior summing lever pivots on the rod end of actuating cylinder piston and connects to valve input crank by a link assembly.

2. Operation

A. General

(1) With its body pivoted on airplane fin structure and actuating cylinder rod end pivoted on rudder, power control unit moves rudder right or left when actuated by rudder pedal or trim input, or by signals from the automatic pilot. Snubbing action provides protection against wind gust damage when airplane is parked.

(2) The yaw damper minimizes "dutch roll" during manual, and automatically controlled flight. It provides rudder displacement, proportional to yaw rate, and opposite to yaw direction of airplane.

B. Manual Control

(1) Rudder pedal and trim input is transmitted to input crank of power control unit assembly through external summing lever and linkage. The input crank rotates, actuating the internal summing levers, which pivot on segment of walking beam assembly, and move piston of dual servo valve. Movement of piston ports hydraulic pressure to one side of pistons in actuating cylinder assembly. Hydraulic fluid is also ported from other side of pistons to hydraulic return system.

(2) Movement of piston may also be governed by yaw damper input, which varies position of walking beam assembly.

(3) Rudder pedal, trim, and yaw damper inputs are combined algebraically by summing levers. Pistons of actuating cylinder assembly move in response to pressure differential. Feedback, provided through external summing lever and linkage, returns piston and sleeve of dual servo valve to neutral. Hydraulic pressure equalizes on both sides of pistons and arrests further motion.

C. Autopilot Operation

(1) Hydraulic solenoid control valve is energized with 28 volts dc. This connects 3000 psi to transfer valve, which converts, proportionally, electrical signals from autopilot system into hydraulic flow and control pressure. Control pressure moves yaw damper actuator assembly pistons, moving pivot point of internal summing levers and driving piston and sleeve of dual servo valve from neutral. This causes movement of pistons in actuator cylinder assembly.

(2) Movement of yaw damper actuator pistons generates a balancing signal by linear position transducers, which assists in electrically nulling transfer valve and bringing pistons of yaw damper actuator assemblies to rest, until next change in error signal.

(3) After any imposed error signal and pistons of yaw damper actuator assemblies come to rest, transfer valve is at zero output (null position).

(4) Resulting movement of rudder by actuating cylinder pistons changes airplane course along yaw axis. Any change in course generates another error signal which feeds back through autopilot system to transfer valve, causing repetition of control sequence.

D. Operation of Component Parts

(1) Actuator Cylinder Assembly (Fig. 1103)

(a) Tandem pistons of actuator cylinder supply motion and force output, to position airplane control surface. Piston velocity is snubbed at a controlled rate at each end of stroke by snubbing rings installed near each piston head.

(2) Linear Position Transducer (Fig. 1110)

(a) Movement of core causes electrical feedback signal to close autopilot signal control loop, and null transfer valve, after receipt of input signal.

(3) Dual Servo Valve (Fig. 1108)

(a) Dual servo valve controls hydraulic pressure and flow to actuator cylinder assembly from both hydraulic systems. Valve has a primary piston, and a secondary overriding sleeve, which permits flight control in event of primary piston becoming jammed in open position.

(4) Hydraulic Solenoid Control Valve Assembly (41, Fig. 1101)

(a) Hydraulic solenoid control valve enables pilot to selectively energize yaw damper control mechanism of power control unit assembly.

(5) Bypass Valve Assembly (51, Fig. 1101)

(a) Bypass valve provides low resistance hydraulic fluid flow path from one side to the other of each piston in actuator cylinder assembly, when one or both hydraulic systems are unpressurized.

(6) Filter Element Assemblies (Fig. 1101)

(a) Filter elements (31) protect main hydraulic systems from contamination. Filter elements (37) further protect transfer valves and yaw damper actuator assemblies from contamination.

(7) Check Valve Assemblies (39, Fig. 1101)

(a) These assemblies are located near each pressure port to prevent reverse flow in event of loss of pressure.

(8) Hydraulic Thermostat Valve Assemblies (68, Fig. 1101)

(a) Hydraulic thermostat valves maintain hydraulic fluid temperature within power control unit assembly above 0°F during low ambient temperature conditions. Valve snaps open with decreasing fluid temperature and causes hydraulic fluid to circulate through power control unit.

(b) Valve closes on increasing temperature to prevent unnecessary heating of hydraulic fluid.

3. Leading Particulars

A. Length (between support centers)

(1) Extended -- 29.432 to 29.512 inches

(2) Retracted -- 25.488 to 25.568 inches

B. Weight -- 58.4 pounds

C. Fluid -- BMS 3-11

D. Operating Pressure -- 3000 psi (Systems A and B)

E. Operating Temperature -- -65 to +160°F

F. Ports

(1) Pressure (hydraulic systems A and B). Fitted for 1/4-inch OD tubing in accordance with AND 10050-4.

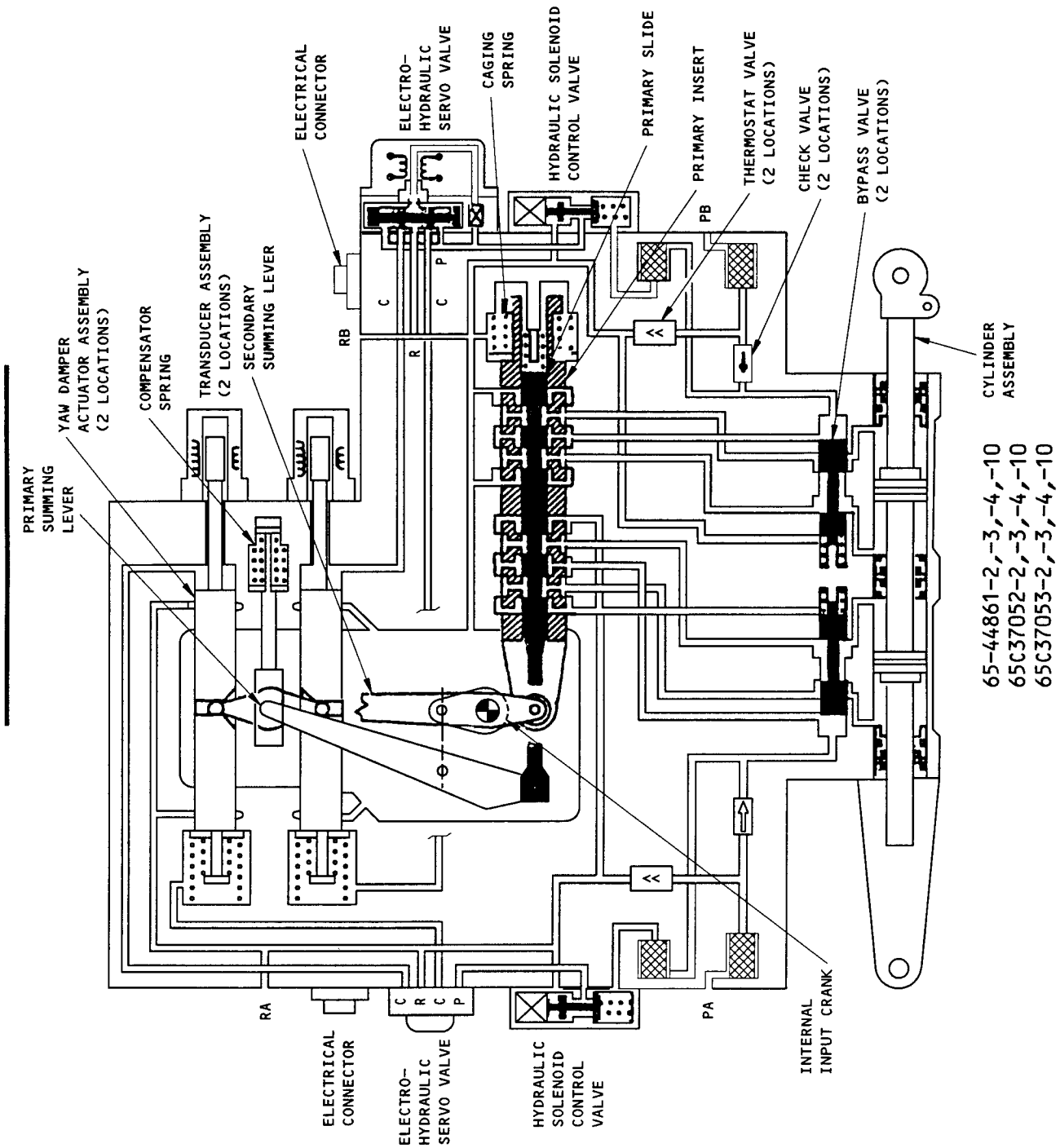
(2) Return (hydraulic systems A and B). Fitted for 3/8 inch OD tubing in accordance with AND 10050-6.

G. Electrical

(1) Solenoid valve actuating voltage -- 28 volts dc.

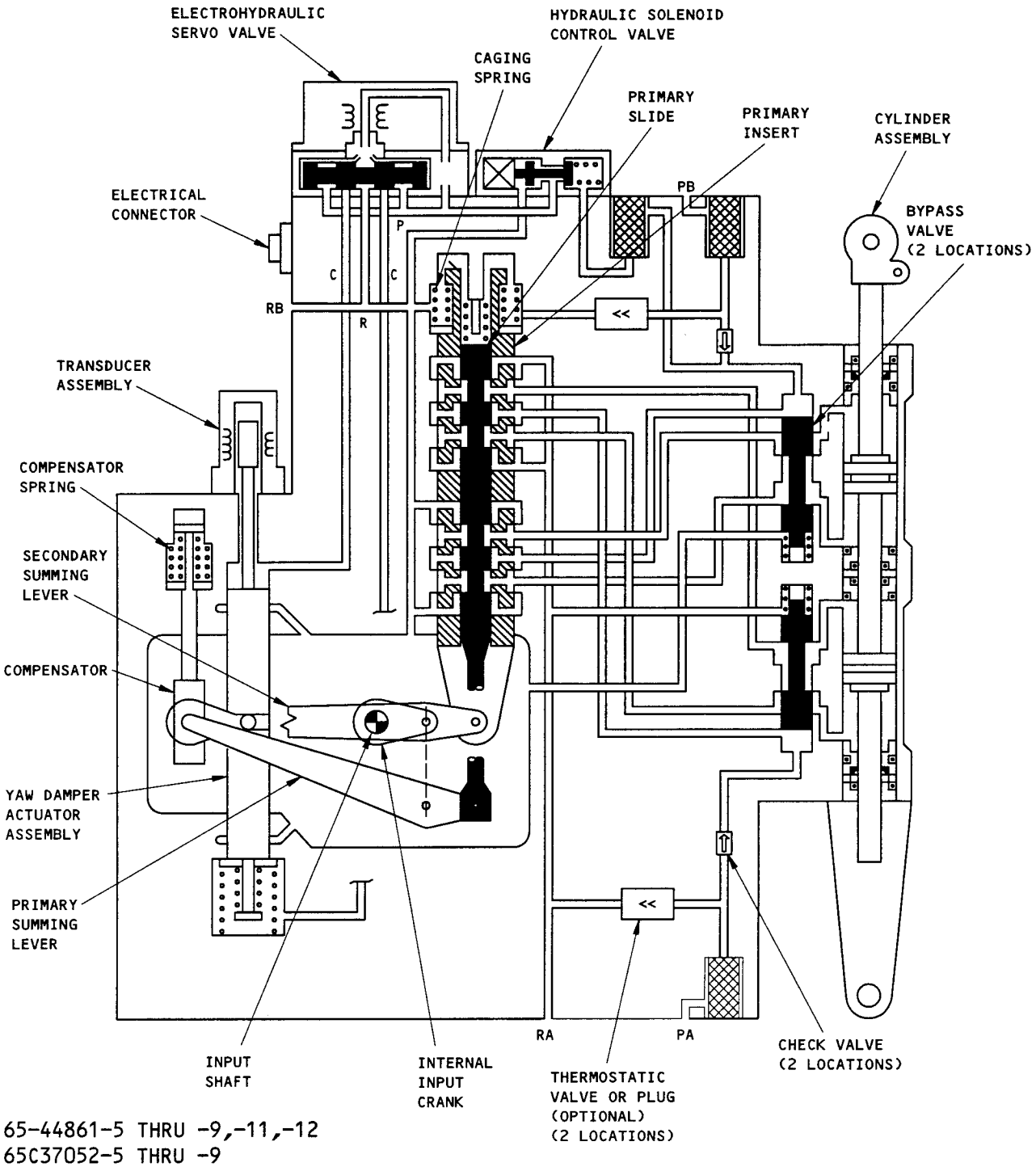
(2) Yaw damper transducer excitation -- 26 volts, 400 Hz ac.

(3) Transfer valve -- 0-8 ma dc differential current.



Power Control Unit Assembly Schematic
Figure 2

M23867



65-44861-5 THRU -9,-11,-12
65C37052-5 THRU -9
65C37053-5 THRU -9

Power Control Unit Assembly Schematic
Figure 3

DISASSEMBLY

NOTE: For units removed for known or suspected malfunctions, test the unit per par. 11 and 12 of TESTING to determine extent of overhaul required or isolation of defects. For units with known or suspected yaw oscillations, refer to par. 13.

1. General

A. Use standard industry practices while disassembling this unit. Component parts of matched sets are serialized.

B. If necessary remove hydraulic fittings per Fig. 1111.

CAUTION: NOTE LOCATIONS OF UNIONS (1, 3) AND REDUCER (4) FOR USE DURING REASSEMBLY. INCORRECT INSTALLATION OF THE UNIONS OR THE REDUCER DURING ASSEMBLY OR DURING INSTALLATION OF THE PCU ON THE AIRPLANE CAN LEAD TO A CROSS CONNECTION OF THE SYSTEM A AND B HYDRAULIC SYSTEMS.

(1) Remove unions (1, 3), reducer (4) and packings (2, 5) from power control unit (6). Note locations of unions (1, 3) and reducer (4) for use during reassembly.

2. Disassembly

A. Power Control Unit (Fig. 1101)

(1) Do not remove nameplate (71) unless replacement is necessary.

(2) To release manifold assembly (9), or cover assembly (9) and retainer assembly (9A), remove, as applicable, parts (1 thru 8).

NOTE: Do not remove bushing (9B) from retainer assembly (9A) unless replacement is necessary.

(3) Remove connectors (10), packings (11), and rings (12).

(4) Remove nuts (14), washers (15), screws (16), collar (17), washer (18), nut (19), and bolts (20, 21).

(5) Separate crank, link, and summing lever assemblies (72, 72A, 72B).

(6) Remove screws (22, 24) to release actuator assembly (27).

NOTE: Keep components of actuator assembly (27) together as a matched set.

(7) Remove packings (23, 25) and rings (26).

(8) Remove cap (28), packings (29), rings (30), filter element (31), packings (32) and rings (33).

(9) Remove caps (34), packings (35), rings (36), filter elements (37), packings (38), and rings (39).

(10) Remove screws (40) freeing valve assembly (41).

(11) Remove packing (42) and plate (43).

(12) Remove screws (44), servo valve (45), packing (46), and plate (47).

(13) Remove cap (48), packing (49), rings (50), valve assembly (51), sleeve (52), slide (53), packing (54), rings (55), and springs (56).

(14) Remove cap (57), packing (58), valve assembly (59), packing (64), and rings (65).

(15) Do not remove seat (60), poppet (61), or spring (62) from cage (63) unless replacement is necessary.

(16) Remove caps (66), packings (67), flow control plugs or thermostatic valve assemblies (68), packings (69), and rings (70).

B. Auxiliary Manifold Assembly (Fig. 1102)

(1) Parts comprising this assembly (1 thru 17) do not require disassembly unless replacement is necessary.

C. Cover Assembly (Fig. 1102A)

(1) Parts comprising this assembly (1 thru 19) do not require disassembly unless replacement is necessary.

D. Cylinder Assembly Buildup (13, Fig. 1101) (Fig. 1103)

(1) Install rod end assembly tool AT8335-1001, on flats of piston (34) and over the bearing end of rod end (21) as shown on Fig. 506.

(2) Remove nut (1), washer (2), nut (3), and washer (4).

(3) Hold piston (34) and remove rod end assembly (21).

NOTE: Do not remove fitting (22) or bearing (23) from braze assembly (24) unless replacement is necessary.

(4) Using nut assembly tool AT83340-1001, remove nuts (5, 25).

CAUTION: PISTON (14, 34) AND SEAL ASSEMBLY (15, 35) MAY BE OVERSIZE PARTS USED WITH OVERSIZE MANIFOLDS (11, FIG. 1104) AND (23, FIG. 1109).

(5) Withdraw pistons (14, 34), scrapers (6, 26), retainers (7, 27), bearings (10, 30).

NOTE: Identify pistons to facilitate assembly.

(6) Remove seals (8, 28), packings (9, 11, 19, 29, 31) and rings (12, 20, 32).

(7) Using snubbing ring clamp AT-83337-1001, remove rings (13, 33).

(8) Remove seal assemblies (15, 35) composed of seals (16, 17, 36, 37), and keys (18, 38).

NOTE: Identify seal assembly and its components, and keys, to facilitate assembly.

(9) Remove screw (44), collar (45), bolts (47, 48), bushings (46), and washers (49).

(10) Separate manifolds (53, 54) releasing bearing (39), tubes (50), packing (51), and rings (52).

(11) Remove packing (40), rings (41), seals (42), and packings (43).

E. Forward Manifold Assembly (53, Fig. 1103)

(1) Parts comprising this assembly (1 thru 11, Fig. 1104) do not require disassembly unless replacement is necessary.

F. Crank, Link, and Summing Lever Assemblies (72, 72A, 72B, Fig. 1101) (Fig. 1105)

(1) Remove collar (1), washer (2), nut (3), washer (4), and bolts (7, 8) to release lever assembly (15).

(2) Remove bearing (5) and sleeve (6). Do not remove bearing (12) unless relacement is necessary.

NOTE: Lever assembly (15) is bonded and lockbolted together and is intended to be replaced as a unit; do not disassemble. Cranks (10, 11) must be kept with corresponding lever assembly (15) as part of matched components of crank assembly (9). Attach temporary tag and identify accordingly.

(3) Remove collar (20), washer (21), nut (22), washer (23), and bolts (24, 25) to separate lever assembly (28) and link assembly (41).

NOTE: Link assembly (41) is bonded and lockbolted together and is intended to be replaced as a unit; do not disassemble.

(4) Remove bearing (26) and spacer (27) from lever assembly (28).

(5) Remove bearing (31) from RH lever subassembly (37) (part of subassembly [34]). Do not remove bearings (29, 30, 31 [staked bearing]) unless necessary for replacement.

NOTE: Link assembly (34) is a bonded assembly and is intended to be replaced as a unit. Do not remove collars (32) and lockbolts (33) or disassemble unit.

G. Aft Manifold Buildup (73, Fig. 1101) (Fig. 1106)

NOTE: Do not remove bearing (19) from lever (20) or bearing (23), rivet (24), or roller (25) from lever (26) unless replacement is necessary.

(1) Remove cap (1) and packing (2).

(2) Remove cap (32), packing (33), spring (34), pin (35), retainer (36), spring (37), and guide (38).

(3) Remove cap (13), packing (14), and rings (15).

(4) Remove collar (16), crank (11, Fig. 1105) and packing (17).

NOTE: Crank (11, Fig. 1105) must be kept with its matching parts (9, Fig. 1105). Attach temporary tag and identify accordingly.

(5) Install walking beam assembly tool, AT83305-1001 or equivalent, compress spring (6), and remove retainer (4), from walking beam assembly (3), as shown in Fig. 503.

(6) Remove tool AT83305-1001 complete with guide (5), spring (6), and cam seat (7).

(7) Using a number 4-40 screw of suitable length, remove pin (8), freeing segments (9, 10) and fork (11).

NOTE: Guide (5), spring (6), seat (7), segments (9, 10) are matched components of walking beam assembly (3) and must be grouped together. Attach temporary tag and identify accordingly.

(8) Remove packing (12).

(9) Push bolt (21) through hole in crank (10, Fig. 1105) and into cavity in manifold assembly (54, Fig. 1103).

(10) Remove parts from valve assembly (40) as follows (Fig. 1108):

NOTE: Do not interchange components of the dual servo valve assemblies (40) because the valve assemblies contain matched parts.

(a) For valve assemblies (68010-5003, -5005, -5007):

1) Remove cap (1), packing (2), spring (3), pin (4), spring (5) and guide (6).

2) Move input lever (34, Fig. 1105) in the direction of an extend command until the crank (15, Fig. 1105) contacts the manifold stop. Secure this position by wedging a nylon rod between the crank and the opposite manifold stop.

3) Using servo retainer assembly tool 68021AT2, depress guide (8) and remove retainer (7), guide (8), spring (9), and guide (10).

(b) For valve assemblies (398310-1001, -1003):

1) Remove cap (1), packing (2) and spring (3).

2) Move input lever (34, Fig. 1105) in the direction of an extend command until the crank (15, Fig. 1105) contacts the manifold stop. Secure this position by wedging a nylon rod between the crank and the opposite manifold stop.

3) Using servo pin assembly tool 398310-AT4, depress guides (4, 8) and remove pin (16) from slide (13).

4) Remove guides (4, 6, 8, 10) and springs (5, 9).

(11) Remove lever assembly (18).

(12) Remove lever assembly (22).

(13) Remove crank (Fig. 1105, Item 10) and spacer (30).

NOTE: Crank (10, Fig. 1105) must be kept with its matching parts (9, Fig. 1105).

(14) Remove bolt (21) from cavity in manifold assembly (54, Fig. 1103).

(15) Remove valve assembly (40) and packings (41, 42).

(16) Remove bearing (27, 31), seal (28) and packing (29).

H. Deleted

I. Dual Servo Valve Assembly (40, Fig. 1106) (Fig. 1108).

NOTE: Do not interchange components of the dual servo valve assemblies (40) because the valve assemblies contain matched parts.

(1) For valve assemblies (68010-5003, -5005, -5007):

(a) Remove slide (14).

(b) Remove cap (1), packing (2), and spring (3).

(c) Remove pin (4), spring (5), and guide (6) from retainer (7).

(d) Remove parts (7) thru (13) as a unit from insert assembly (15).

(e) Use servo retainer assembly tool 68021AT2 to depress guide (8) and remove retainer (7) from insert assembly (13).

(f) Remove guide (8), spring (9), guide (10).

(2) For valve assemblies (398310-1001, -1003):

(a) Remove slide (14).

(b) Remove cap (1), packing (2) and spring (3).

(c) Remove parts (4) thru (13) as a unit from the body assembly (15).

(d) Use servo pin assembly tool 398310-AT4 to depress guides (4, 8) and remove pin (16) from slide (13).

(e) Remove guides (4, 6, 8, 10) and springs (5, 9).

J. Aft Manifold Assembly (54, Fig. 1103) (Fig. 1109)

(1) Parts comprising this assembly (1 thru 23, Fig. 1109) do not require disassembly unless replacement is required.

K. Yaw Damper Actuator Assembly (27, Fig. 1101) (Fig. 1110)

(1) Do not disassemble transducer assembly (1).

(2) Remove diaphragm (10) from sleeve (19) and remove packing (11) and rings (12).

(3) Remove cap (2), packing (3), rings (4) and spring (5).

(4) Withdraw parts (6 thru 9), (13 thru 16), and piston (18) as a unit from sleeve (19).

NOTE: Keep piston (18) and sleeve (19) together as lapped and mated assembly (17). Attach temporary tag and identify accordingly.

(5) Depress retainer (7) and remove pin (6).

(6) Remove retainer (7), spring (8), and retainer (9).

(7) Using collet retracting tool AT59138, depress retainer (15) and remove rings (14). Remove tool AT59138, retainer (15), and spring (16), as shown in Fig. 502.

(8) Using torque tool AT59196-3 or equivalent, unscrew core (13) from piston (18).

CLEANING

1. General

A. Wash all metal parts, except bearings (23, Fig. 1103, and 5, 12, 26, 29, 30 and 31, Fig. 1105) in solvent, Federal Specification P-D-680 or equivalent.

B. Using stiff bristle brush, clean all bores, holes, passages, and chambers.

C. Thoroughly flush all passages, cavities and ports.

CAUTION: DO NOT USE POINTED OBJECTS TO CLEAN ORIFICES, PASSAGES, OR INTERIOR PARTS, AS THIS MAY CHANGE OPERATING CHARACTERISTICS.

D. Dry parts with clean, lint-free cloth or clean, dry compressed air at approximately 25 psi pressure.

E. Clean filter elements (31 and 37, Fig. 1101) as follows:

(1) Backwash filter element with solvent.

(2) Use a soft bristle brush if necessary, to loosen deposits of foreign material.

(3) Blow clean, dry, low-pressure air through element.

2. Bearings

A. Wipe bearings (23, Fig. 1103 and 5, 12, 26, 29, 30, and 31, Fig. 1105) with a cloth moistened with solvent P-D-680 or equivalent.

B. Dry with a clean, lint-free cloth or with clean, dry compressed air.

C. For further information refer to 20-30-01, Cleaning and Relubricating Antifriction Bearings.

INSPECTION/CHECK

1. General

   A. Examine all parts for cracks, burrs, nicks, scoring, and corrosion, using strong light and ten power magnification.

   B. Check threaded areas for stripped or crossed threads and accumulations of foreign material.

   C. Examine parts for distortion.

   D. Check all O-ring and packing set grooves for damage such as distortion, burrs and corrosion.

   E. Examine all plated and painted areas for blisters, chipping and flaking.

   F. Check ball bearings for roughness, binding, and excessive axial and radial play.

   G. Check nameplates for legibility and security of attachment.

2. Examination of Power Control Unit Assembly (See figure 1101.)

   A. Examine electrohydraulic servo valve (45) as follows:

      (1) Check electrical contact pins of receptacle for corrosion and distortion.

      (2) Examine surface finish of 9/16 inch diameter area surrounding each of the four flow passages. There must be no defects which will cause leakage after assembly.

      (3) Refer to manufacturers instructions for further examination requirements.

   B. Check filter elements (31 and 37).

      (1) Install filter element (37) in Test Fixture, TF59197-105 or filter element (31) in Test Fixture, TF59197-107 or equivalent as shown in figure 301.

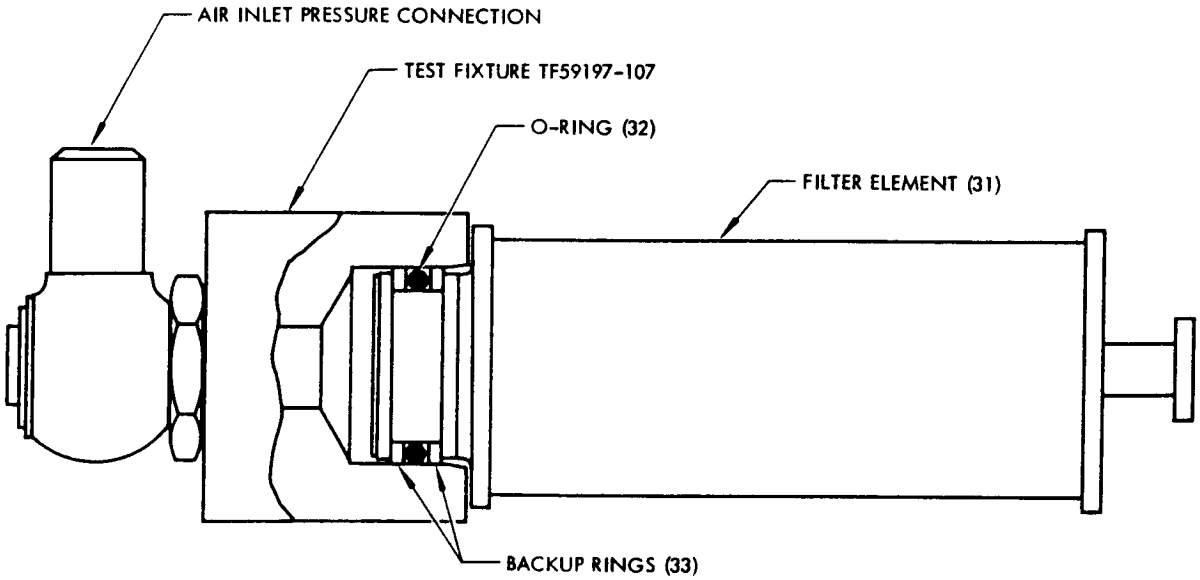
      (2) Connect test fixture and filter element to test setup and thoroughly wet the filtering surface with alcohol, Quakersol or equivalent.

      (3) Connect a source of clean dry air filtered to 2 microns nominal, and a 10-inch water manometer to the test fixture.

(4) Immerse filter element in a container of alcohol, Quakersol or equivalent and hold the axis of the filter element horizontal at depth shown.

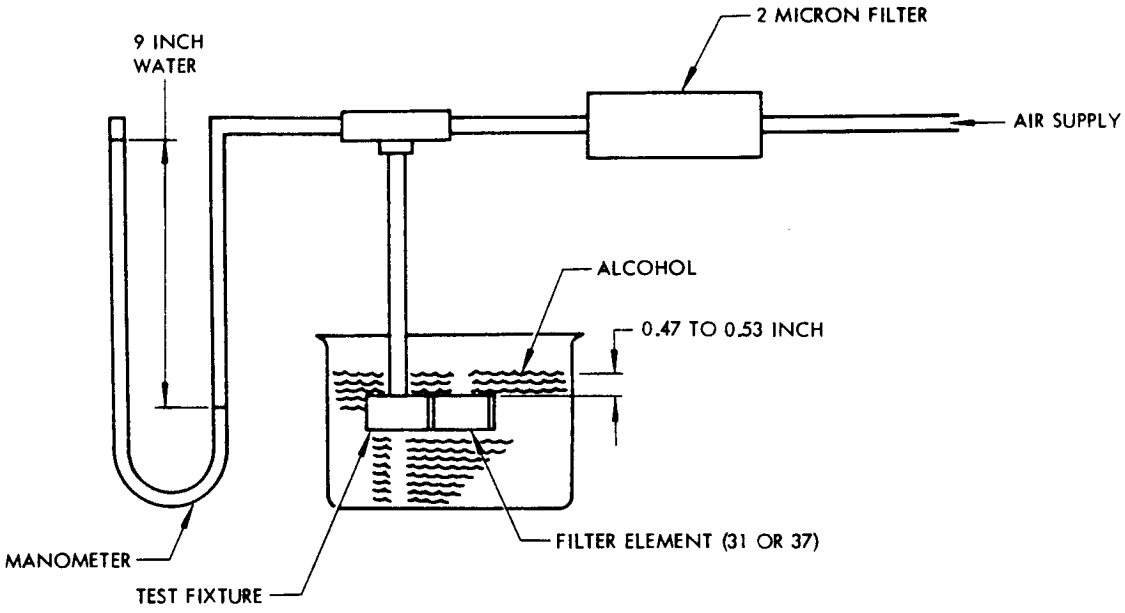
(5) Apply air pressure, equal to 9 inches of water, to the filter element.

(6) Rotate filter element. There must be no air leakage through filter element throughout 360 degree rotation.

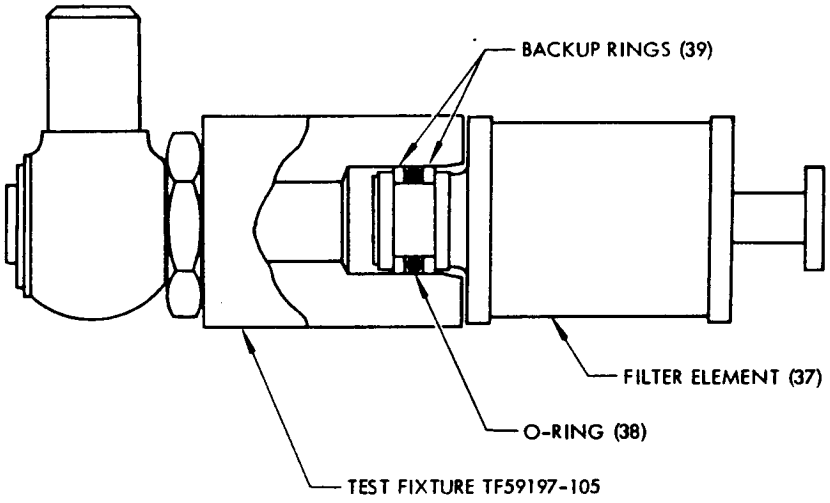


NOTE: PART INDEX NUMBERS APPLY TO FIGURE 1101

Filter Element Check Details
Figure 301 (Sheet 1)



TEST SETUP



Filter Element Check Details
Figure 301 (Sheet 2)

C. Examine check valve assembly (59)

(1) Check movement of poppet (61) within cage (63) for binding.

(2) Examine poppet stem hole in cage (63) for excessive wear or out of roundness.

D. Perform a dye penetrant check on flow control plug (68).

3. Examination of Auxiliary Manifold Assembly (See figure 1102.)

A. Check pins (3 and 8) for corrosion and distortion.

B. Examine pins (11 and 13) and plugs (12 and 14) for security of installation.

C. Check inserts (15 and 16) for damaged, broken or distorted coils.

D. Check cavities and ports for particle contamination.

E. Perform a dye penetrant examination on manifold (17).

F. Check wiring (9) for continuity and dielectric strength in accordance with "TESTING," steps 11.A. and 11.C.

4. Checking of Cylinder Assembly Buildup, (13, figure 1101) (See figure 1103.)

A. Examine sliding surfaces of pistons (14 and 34) for scoring or evidence of abnormal sliding action.

B. Check bearings (10, 30 and 39) for wear.

C. Perform a dye penetrant examination on retainer (7) and bearings (10, 30, and 39).

D. Perform a magnetic particle examination on rings (13), pistons (14 and 34) and tubes (50).

5. Examination of Forward Manifold Assembly (See figure 1104.)

A. Check pins (1) and plugs (2) and stop (4) for security of installation.

B. Check bolts (6 and 8) and collars (5 and 7) for security of installation.

C. Check manifold assembly (9) for security of bonding.

D. Examine surface of cylinder bore in manifold (11) for scoring or evidence of abnormal sliding action.

E. Perform a dye penetrant check on manifold assembly (9), bushing (3) and stop (4).

6. Checking of Crank, Link and Summing Lever Assemblies (72, 72A, 72B, Fig. 1101) (See Fig. 1105.)

   A. Check serrations of cranks (10, 11) and levers (18, 19) for damage.

   B. Perform a dye penetrant examination on sleeves (16, 35) levers (18, 19), subassembly (34), segments (38, 39), side plate (40), link assembly (41) and segment (45).

      CAUTION: TO PREVENT DAMAGE TO ANTIFRICTION BEARINGS, IT IS NECESSARY TO PROTECT BEARINGS FROM FLUID USED IN PERFORMING MAGNETIC PARTICLE OR DYE PENETRANT EXAMINATION OF COMPONENTS CONTAINING BEARINGS. AN ADEQUATE EXAMINATION CAN BE MADE BY CAREFULLY MASKING OFF THE BEARING AND APPLYING THE FLUID BY BRUSH INSTEAD OF BY DIPPING.

      NOTE: It is not necessary to press out a bearing to check inside of component bore unless crack indications are detected during visual examination.

   C. Perform a magnetic particle examination on bolts (8, 25) and cranks (10, 11).

   D. Check bearing (29) for axial play. Maximum axial play limit is 0.028 inch.

7. Checking of Aft Manifold Buildup (73, Fig. 1101) (Fig. 1106.)

   A. Check springs (6, 34, 37) for roundness by rolling on a flat surface. There must be no wobble.

   B. Test springs (6, 34, 37) in accordance with Fig. 302.

INDEX NO. FIG. (1106)	FREE LENGTH (INCHES)	TEST LENGTH (INCHES)	ALLOWABLE LOAD LIMITS (POUNDS)
34	1.473	0.623 to 0.627 0.298 to 0.302	3.65 to 4.15 5.05 to 5.75
37	1.598	0.748 to 0.752 0.427 to 0.523	3.65 to 4.15 5.05 to 5.75
6	1.092	0.923 to 0.927 0.823 to 0.827	123 to 137 197 to 219

Compression Spring Check Data
Figure 302

C. Perform a dye penetrant examination on cap (1, 13, 32) and spring (6).

D. Perform a magnetic particle examination on retainer (4), seat (7) , pins (8, 35), segments (9, 10), fork (11), levers (20, 26), bolt (21) and guides (5, 36, 38).

8. Deleted

9. Examination of Dual Servo Valve Assembly (Fig. 1108.)

A. For valve assemblies (68010-5003, -5005, -5007):

(1) Check slide (14) and insert assembly (13).

(a) Wet sliding surfaces of slide (14) and insert assembly (13) with hydraulic fluid, BMS 3-11.

(b) Carefully push slide (14) into the bore of insert assembly (13), and rotate 360 degrees while sliding back and forth. Slide (14) must move freely without binding.

(2) Check insert assemblies (13, 15).

(a) Wet sliding surfaces of insert assemblies (13, 15) with hydraulic fluid, BMS 3-11.

(b) Carefully push insert assembly (13) into bore of insert assembly (15), and rotate 360 degrees while sliding back and forth. Insert assembly (13) must move freely without binding.

B. For valve assemblies (398310-1001, -1003):

(1) Check primary slide (14) and secondary slide (13).

(a) Wet sliding surfaces of primary slide (14) and secondary slide (13) with hydraulic fluid, BMS 3-11.

(b) Carefully push primary slide (14) into the bore of secondary slide (13), and rotate 360 degrees while sliding back and forth. The primary slide (14) must move freely without binding.

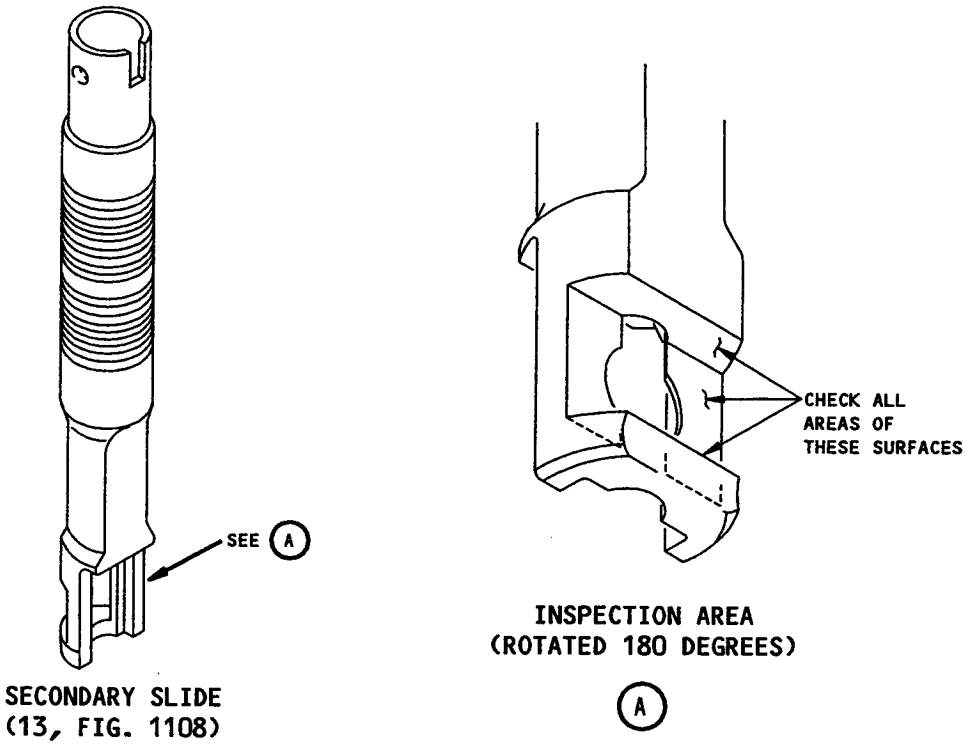
(2) Check secondary slide (13) and body assembly (15).

(a) Wet sliding surfaces of secondary slide (13) and body assembly (15) with hydraulic fluid, BMS 3-11.

(b) Carefully push secondary slide (13) into bore of body assembly (15), and rotate 360 degrees while sliding back and forth. Secondary slide (13) must move freely without binding.

(3) Perform a fluorescent dye penetrant check on the secondary slide (13) in the area shown in Fig. 303 per SOPM 20-20-02, sensitivity Level 4.

C. Check springs (3, 5, 9) for roundness by rolling on a flat surface. There must be no wobble.



SECONDARY SLIDE
(13, FIG. 1108)

INSPECTION AREA
(ROTATED 180 DEGREES)

(A)

Secondary Slide P/N 398313-1, Dye Penetrant Check
Figure 303

10. Examination of Aft Manifold Assembly (Fig. 1109)

    A. Examine the surface of the cylinder bore in manifold (23) for scoring or evidence of abnormal sliding action.

    B. Check pins (3, 8) for corrosion and distortion.

    C. Examine pins (11, 13, 15) and plugs (12, 14, 16) for security of installation.

    D. Check inserts (17, 18, 19, 20, 21) for damaged, broken, or distorted coils.

    E. Perform a penetrant examination on manifold (23) and stop (22).

    F. Check wiring (9) for continuity and dielectric strength per Testing par. 11.A, 11.C, 11.D.

11. Examination of Yaw Damper Actuator Assembly (Fig. 1110)

    A. Check surface of walking beam bearing area in piston (18) for scoring or evidence of abnormal sliding action.

    B. Check surface of sleeve (19) 0.625-inch ID for scoring or evidence of abnormal sliding action.

    C. Check piston (18) and sleeve (19).

        (1) Wet surfaces of piston (18) and sleeve (19) with hydraulic fluid, BMS 3-11.

        (2) Carefully slide piston (18) into sleeve (19) and rotate 360 degrees while sliding back and forth. Piston must slide freely without binding.

    D. Perform a penetrant examination on springs (5, 8).

    E. Perform a magnetic particle examination on piston (18) and sleeve (19).

    F. Check electrical contact pins on transducer assembly (1) for corrosion and distortion.

12. Examination of Retainer Assembly (9A, Fig. 1101)

    A. Check bushing (9B) for wear or corrosion.

    B. Perform penetrant examination of retainer (9C).

13. Examination of Cover Assembly (9, Fig. 1101) (Fig. 1102A).

    A. Check pins (12) for corrosion and distortion.

    B. Perform penetrant examination of cover (19).

    C. Check wiring (15, 16) for continuity and dielectric strength in accordance with TESTING, steps 11.A., 11.C.

14. Do a check on the 0.3250-inch O.D. surface of the segment and cam segment (IPL Fig. 1106, Item 9 and 10). Look for areas of scoring, wearing, or evidence of abnormal sliding.

REPAIR

1. Repair

A. Repair minor defects in accordance with standard industry practices.

B. Renew lapped parts to noted finish, as necessary.

C. Manifold Cylinder Bore (11, Fig. 1104; 23, Fig. 1109) (See Fig. 400 for configuration identification.)

CAUTION: THOROUGHLY CLEAN MANIFOLD AND PASSAGES AFTER MACHINING.

(1) Method 1 -- (Oversize and anodized) (Fig. 400A)

CAUTION: A MANIFOLD REPAIRED PER THIS PROCEDURE REQUIRES AN OVERSIZED PISTON AND SEAL ASSEMBLY (14, 15, 34, 35, FIG. 1103).

(a) Machine bore, within repair limits shown to remove defects (Dia. -A-).

(b) Shot-peen as noted. Machine relief in bore (Dia. -B-).

(c) Hard anodize relief as noted.

(d) Hone bore to finish and diameter noted (Dia. -C-).

(e) Anodize bore entry chamfers.

(f) Rubber stamp (BMS 3-11 fluid resistant) 0.015 OVERSIZE or 0.030 OVERSIZE, as applicable, adjacent to manifold part number.

(g) Vibro-engrave 0.015 OS or 0.030 OS adjacent to bore on a flat surface.

(2) Method 2 -- Deleted. Superseded by method 3 (Steel Sleeve Installation).

(3) Method 3 -- (Steel Sleeved Bore) (Fig. 401).

NOTE: This method allows for repair of manifolds which have bare, hard anodized, chrome plated, or oversized bores providing wear does not exceed 1.548-1.550 inch diameter.

(a) Plug all passages and machine bore (Dia. -B-) and counterbore to dimensions shown to remove defects. Maintain surface finish of 32 rhr or better.

(b) Fabricate sleeve 65C30874-4 as shown in Fig. 401 (Sheet 3). Use 4330M or 4130 seamless tubing, heat treated to 150-170 KSI.

(c) Magnetic particle check (20-20-01) after machining.

(d) Clean sleeve (20-30-03).

(e) Finish as shown on Fig. 401 (Sheet 3).

(f) Hone DIA -B- to obtain a 0.0015-0.0025 interference fit to actual sleeve O.D. Keep manifold and sleeve as a matched set.

(g) Thoroughly clean manifold including interior passages to remove grease, oil and solid contaminant (Ref 20-30-03).

(h) Penetrant check manifold per 20-20-02.

(i) Alodine machined surfaces of manifold per 20-43-03.

(j) Heat manifold to 250°F and cool sleeve to -65°F then install sleeve in manifold. Check that sleeve has completely and firmly bottomed on internal shoulder of manifold.

(k) After parts have returned to room temperature, check that depth of sleeve from the opposite manifold face is within limit shown.

(l) Hone sleeve to dimension and finish noted and clean bore per 20-30-03. Dry thoroughly then oil cylinder bore with BMS 3-11 hydraulic fluid.

(m) Identify manifold by suitable means as part numbers 65C30874-1, -2 or -3.

(n) Steel stamp SS on nameplate (71, Fig. 1101) after serial number.

D. Center Bearing (39, Fig. 1103)

NOTE: This rework is recommended to eliminate an audible clicking or striking sound which may be heard as the piston is moved from its full-travel position.

(1) Machine tapered notches and grooves as shown in Fig. 401A (both ends).

E. Walking Beam Assembly (Fig. 401B)

NOTE: This rework is recommended to eliminate wear on the shaft of the walking beam segment and cam segment (9, 10, Fig. 1106).

(1) Machine flats as shown in Fig. 401B. Only remove as much material as necessary to eliminate wear marks. The depth of the flats cannot exceed the dimensions shown.

(2) If the walking beam segment or the cam segment has been reworked and the assembled rudder PCU does not pass the Yaw Damper System Phase lag test (par. 12.P. of the Testing Section), the walking beam assembly must be replaced.

F. Summing Lever Assembly (28, Fig. 1105) repair for bearing (29, Fig. 1105) replacement (Fig. 401C)

(1) Machine bore within repair limit shown with a finish of 63 RMS or better.

(2) Countersink both sides of bore as shown and break sharp edges to 0.005-0.020 inch.

(3) Penetrant check reworked area per 20-20-02.

(4) Brush alodine reworked area per 20-43-03.

(5) Fabricate split sleeve as shown. Use 6061-T6 Al alloy. Finish must be 32 RMS or better. Break all sharp edges to 0.005-0.020 inch.

(6) Penetrant check the sleeve per 20-20-02.

(7) Brush alodine the sleeve per 20-43-02.

(8) Install sleeve into summing lever with BMS 5-95 sealant.

(9) Install bearing (29) in summing lever assembly (28) and roller swage sleeve per 20-50-03.

2. Refinish

NOTE: Refer to 20-30-02 for stripping of protective finishes, 20-10-01 for refinish of high strength steel parts, and to 20-41-01 for explanation of F and SRF finish codes.

A. If plated or painted surfaces are worn or chipped, refinish the following parts as indicated:

(1) Refinish components of rudder power control unit assembly (Fig. 1101).

(a) Seal plate (43, 47) -- Anodize in accordance with MIL-A-8625, dyed purple color number 27144 in accordance with Federal Standard 595. Material: Al alloy.

(b) Flow control plug (68) -- Chromic acid anodize (F-2.26) all over. Material: Al alloy.

(2) Manifold (17, Fig. 1102), cover (19, Fig. 1102A), bracket (18, Fig. 1102A), plug (10, Fig. 1101), retainer (9C, Fig. 1101) -- Chromic acid anodize (F-2.26) all over. Material: Al alloy.

(3) Cylinder Assembly Buildup Items (Fig. 1103)

(a) Rings (13, 33) -- No finish (F-25.01) except oil all over.

(b) Braze assembly (24, P/N 69-35535-2) -- Cadmium plate (F-15.06) all over. Material: 4340 steel (160-180 ksi).

(c) Bonded assembly (24, P/N 69-35535-4) -- Touch-up finish using stylus cadmium plating F-15.29. Use care not to damage the adhesive bond. Material: 4340 steel (160-180 ksi)

(d) Retainers (7, 27) -- Fig. 401A.

(e) Bearings (10, 30) -- Fig. 401A.

(f) Bearing (39) -- Fig. 401A.

(g) Piston (14, 34) -- (Fig. 401A).

1) Refinish as noted.

2) Prefinish chrome plated OD to 8 microinches.

3) Crisscross lap indicated area to surface finish of 8 to 12 microinches.

4) Solvent clean surface per 20-30-03 using perchloroethylene.

5) Crisscross lap with teflon lap using 40 to 50 reciprocal strokes. Apply substantial pressure to teflon lap.

6) Wipe excess teflon from surface.

(h) Tube (50) -- Passivate (F-8.07) all over. Material: 17-4PH CRES (180-200 ksi).

(i) Bearing retaining nut (5) -- Cad plate per F-15.02. Material: 4130 steel (160-180 ksi).

(4) Manifold Assembly Items (Fig. 1104)

(a) Bushings (3) -- Cadmium plate (F-4.201) all over. Material: Al-Ni-Br per AMS 4640.

(b) Stop (4) -- Passivate (F-8.07) all over. Material: 303 SE CRES.

(c) Manifold assembly (9) -- Chromic acid anodize (F-2.26) all over. Use a maximum temperature of 170°F for water seal. Material: Al Alloy.

(5) Crank, Link, and Summing Lever Items (Fig. 1105).

(a) Spacers (6, 27) -- Cadmium plate (F-1.1923) all over. Material: NAS43HT6-37 or 4130 steel.

(b) Bolt (8, 25) -- Cadmium plate (F-1.1926) all over. Material: 4340 steel (160-180 ksi).

(c) Crank (10) -- Cadmium plate (F-15.02) and nickel plate (F-14.19) to indicated areas only (Fig. 401A).

(d) Crank (11) -- Cadmium plate (F-15.02) to indicated area only (Fig. 401A).

(e) Lever assembly (15) and subassembly (34) -- Chromic acid anodize (F-2.26) all over, before bearing installation. Use a maximum temperature of 170°F for water seal. Material: Al Alloy.

(f) Link assembly (41) -- Chromic acid anodize (F-2.26) all over, after bonding. Use a maximum temperature of 170°F for water seal. Material: Al Alloy.

(6) Manifold Buildup Items (Fig. 1106).

(a) Caps (1, 13, 32) -- Chromic acid anodize (F-2.26) all over. Material: Al Alloy.

(b) Walking beam assembly (3), retainer (4), guide (5), seat (7), pins (8, 35), segments (9, 10), fork (11), lever assembly (18), lever (20), bolt (21), lever assembly (22), lever (26), and springs (34, 37) -- No finish (F-25.01), except oil all over.

(c) Guides (36, 38) -- Passivate (F-8.07) all over. Material: 440C CRES (Rc 55-59).

(d) Spring (6) -- Electroless nickel plate (F-1.801) all over. Material: Elgiloy.

(7) Manifold Assembly Items (Fig. 1109).

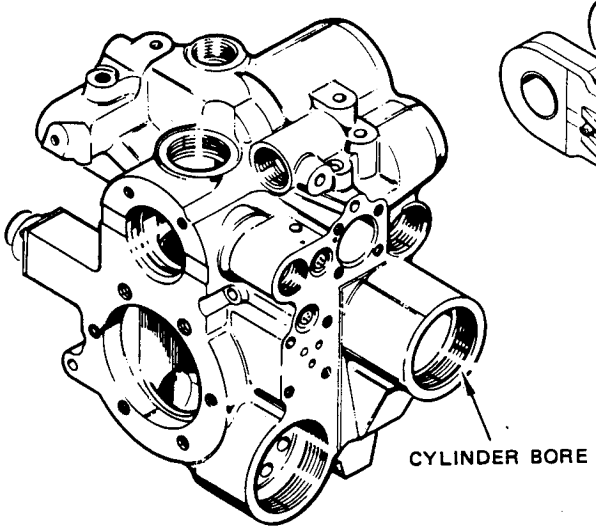
(a) Stop (22) -- Passivate (F-8.07) all over. Material: 303 SE CRES.

(b) Manifold (23) -- Chromic acid anodize (F-2.26) all over. Material: Al Alloy.

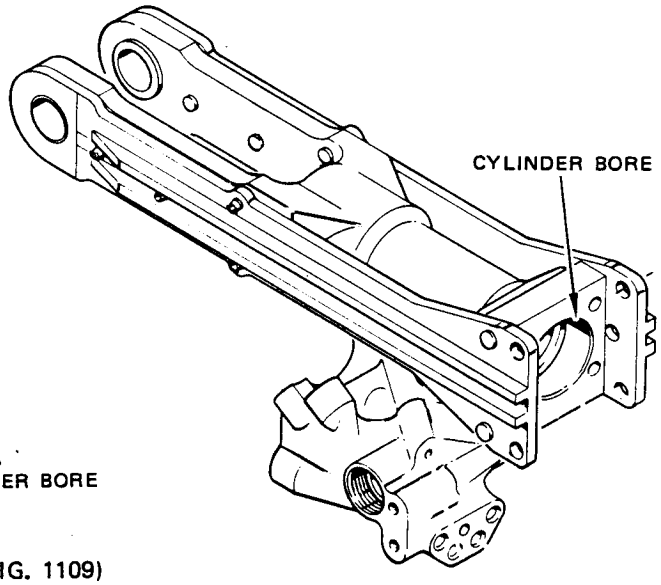
(8) Actuator Assembly Items (Fig. 1110).

(a) Springs (5, 8) -- Electroless nickel plate (F-1.801) all over. Thickness of plating 0.0003 to 0.0005 inch. Material: Elgiloy.

(b) Sleeve (19) -- Fig. 401A.

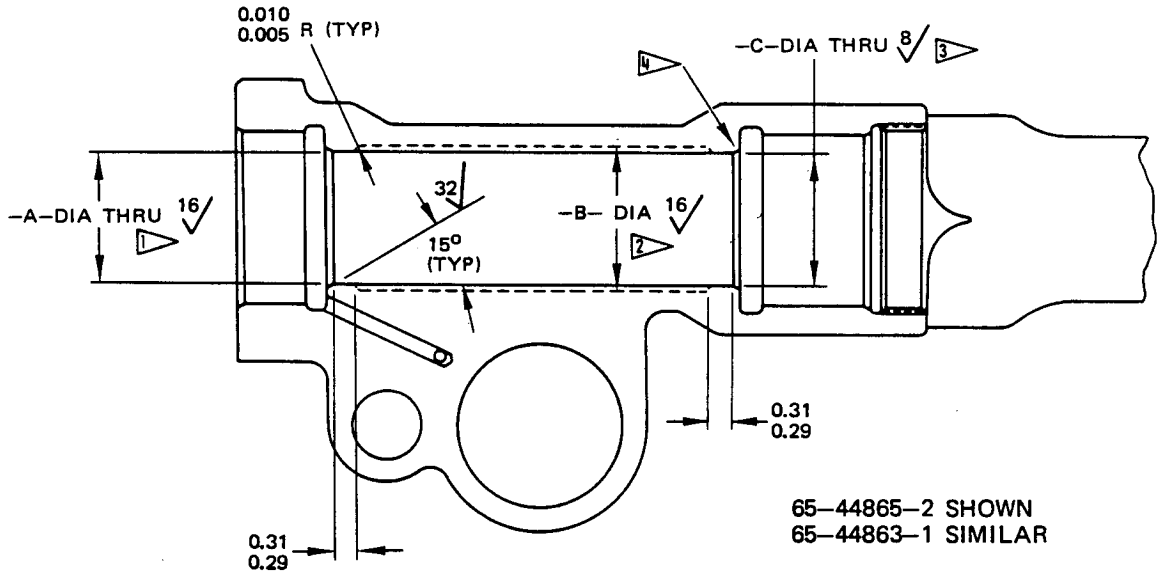


MANIFOLD (23, FIG. 1109)
(65-44863-1)



MANIFOLD (11, FIG. 1104)
(65-44865-2)

Manifold Bore Identification
Figure 400



65-44865-2 SHOWN
65-44863-1 SIMILAR

-A- 1	-B- 2	-C- 3	AMOUNT OVERSIZE
1.440 1.439	1.446 1.445	1.4444 1.4440	0.015
1.455 1.454	1.461 1.460	1.4594 1.4590	0.030

REFINISH (EXTERIOR)

CHROMIC ACID ANODIZE (F-2.26) OR (F-17.04)
PLUS ONE COAT PRIMER, BMS 10-11, TYPE 1 (F-20.02)
NO PRIMER IN HOLES, PORTS, OR BORES

REPAIR
AS NOTED 1 2 3 4

SHOT PEEN: (REF 20-10-03)
0.016–0.033 SHOT SIZE
0.010–0.013A† INTENSITY

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

1 MACHINE BORE THRU TO DIA -A- TO REMOVE DEFECTS. SHOT PEEN BORE

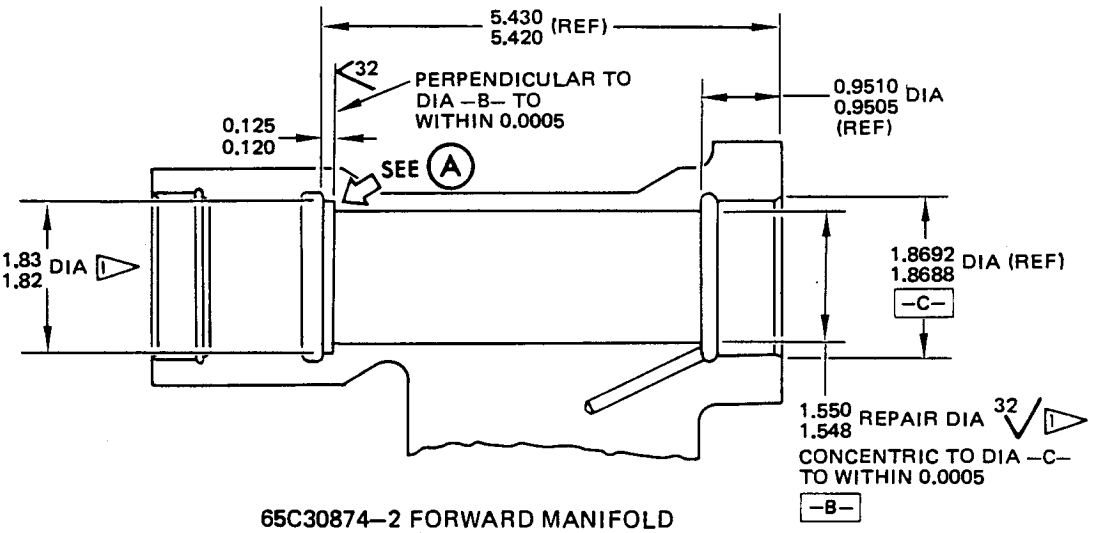
2 AFTER 1 MACHINE RELIEF IN BORE TO DIA -B- WITHIN AREA SHOWN. HARD ANODIZE (F-2.204) ENTIRE SURFACE BETWEEN 0.29–0.31 LANDS.

3 AFTER 2 HONE BORE THRU TO DIA -C-

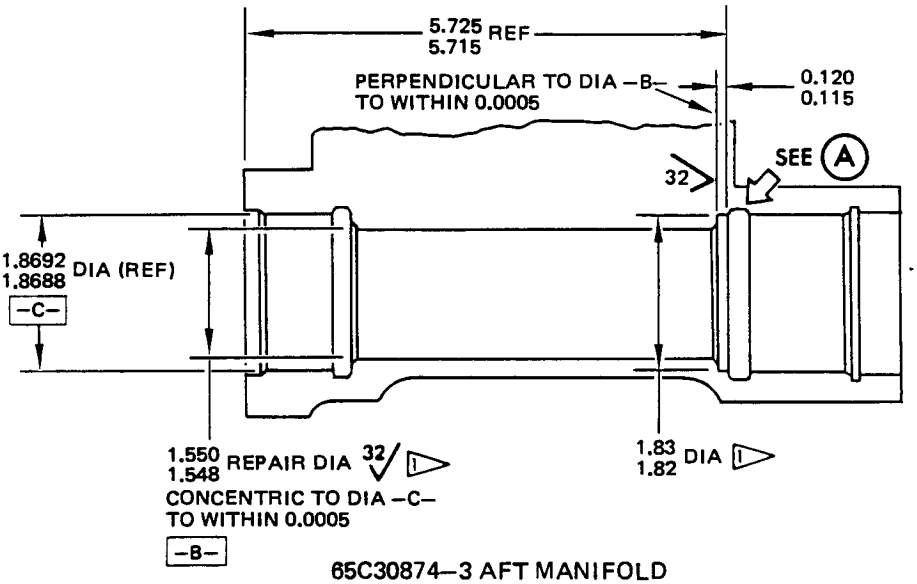
4 CHROMIC ACID ANODIZE (F-2.26) CHAMFERS BOTH ENDS

METHOD 1
OVERSIZE AND ANODIZED

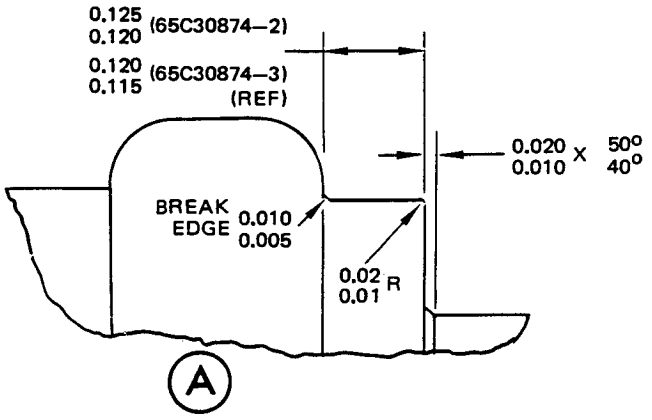
Manifold Bore Repair
Figure 400A



65C30874–2 FORWARD MANIFOLD

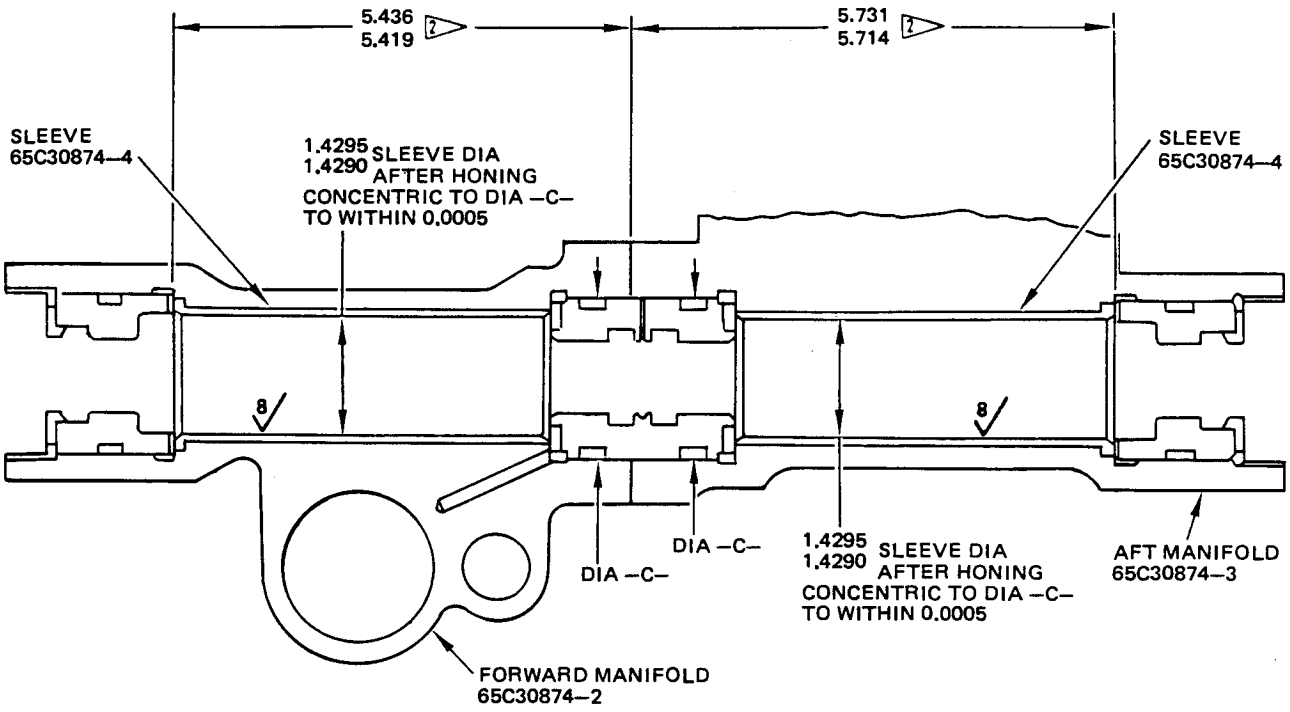


65C30874–3 AFT MANIFOLD



METHOD 3
STEEL SLEEVE REPAIR

Manifold Bore Repair
Figure 401 (Sheet 1)



65C30874–1
MANIFOLD ASSY

REFINISH (EXTERIOR)

CHROMIC ACID ANODIZE (F–2.26)

1 REPAIR DIA FOR INSTALLATION OF REPAIR SLEEVE

2 DIM BETWEEN SLEEVE FLANGE TO THE OPPOSITE FACE OF MANIFOLD

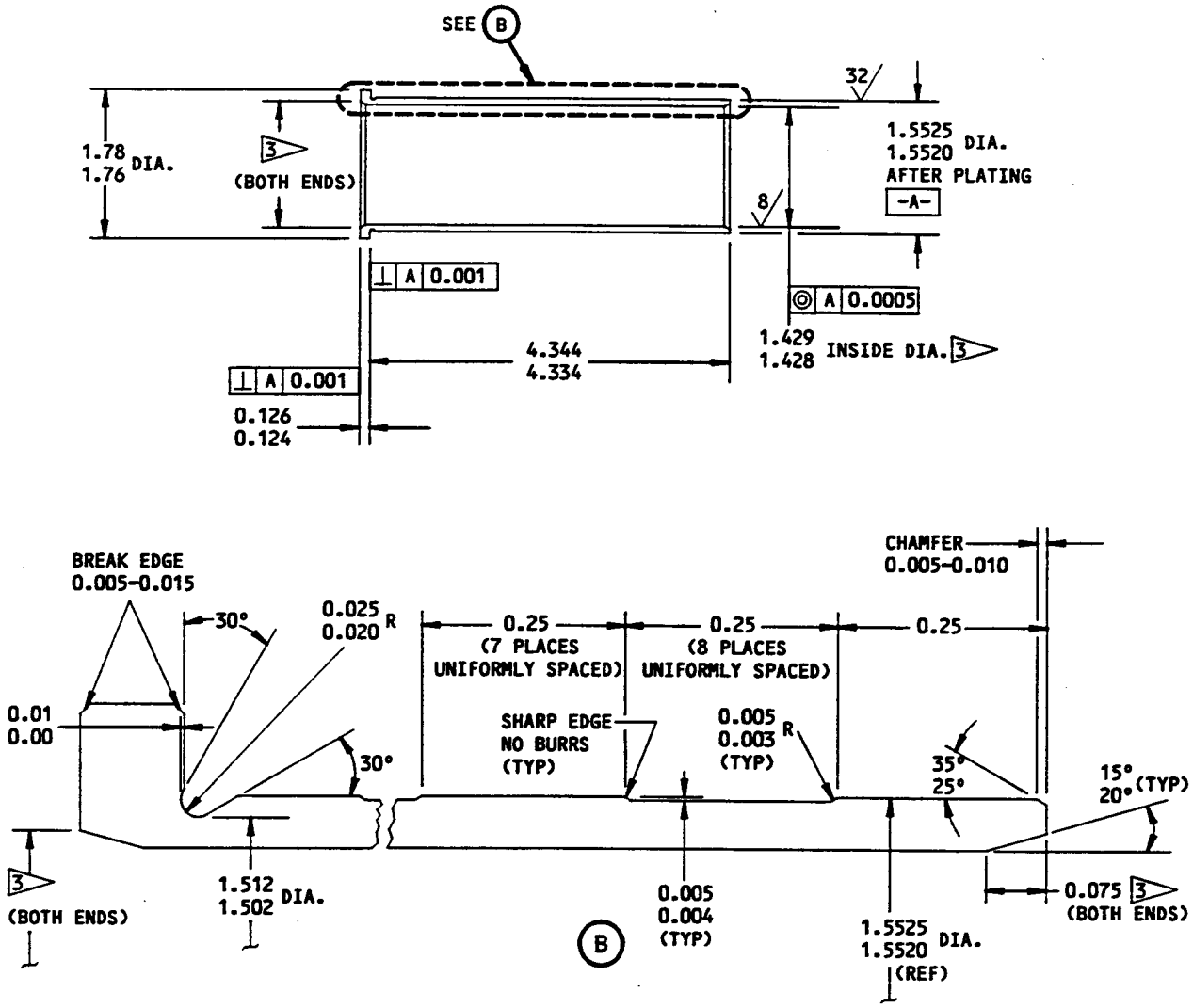
REPAIR

REF 1

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

METHOD 3
STEEL SLEEVE REPAIR



FINISH

CADMIUM PLATE (F-15.25), EXCEPT 0.0002-0.0003 THICK, AND COAT WITH PRESERVATIVE OIL ALL OVER EXCEPT WHERE NOTED BY 3

3 NO CAD PLATE ON INSIDE DIA. OR INSIDE DIA. CHAMFERS (BOTH ENDS)

REPAIR

MATERIAL: 4340M OR 4130 SEAMLESS STEEL TUBING, 150-170 KSI

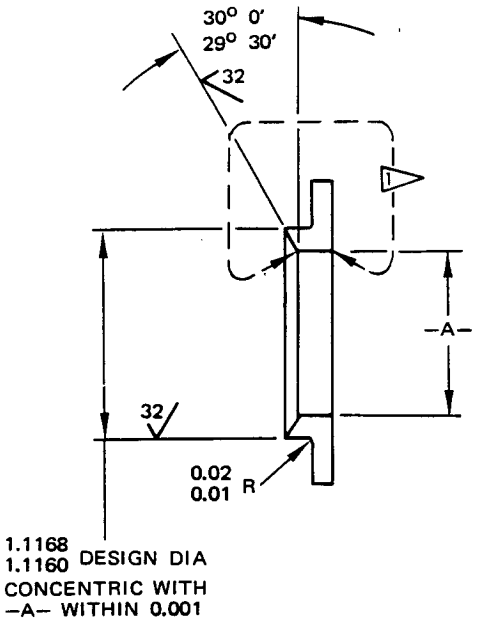
ALL DIMENSIONS ARE IN INCHES

TOLERANCES: ANGLES ± 1/2°
DECIMALS ± 0.01

METHOD 3

STEEL SLEEVE FABRICATION

Manifold Bore Repair
Figure 401 (Sheet 3)

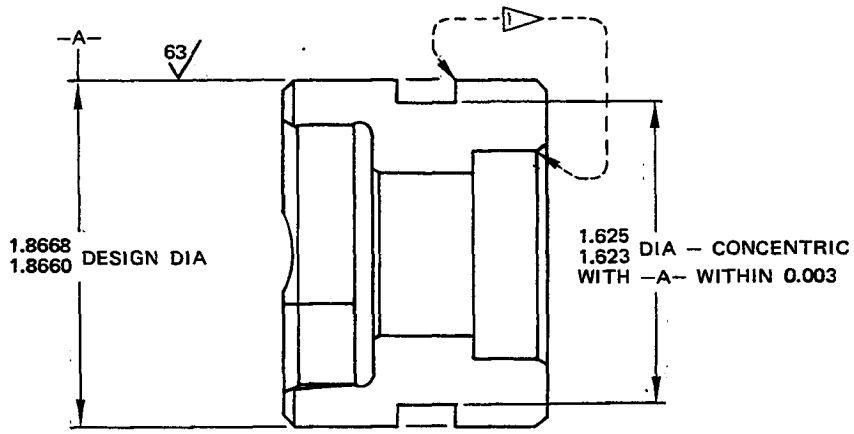


REFINISH

CADMIUM PLATE SURFACES
NOTED BY

MATERIALS: AL-NI BRONZE PER AMS4640

RETAINER (7, 27, FIG. 1103)

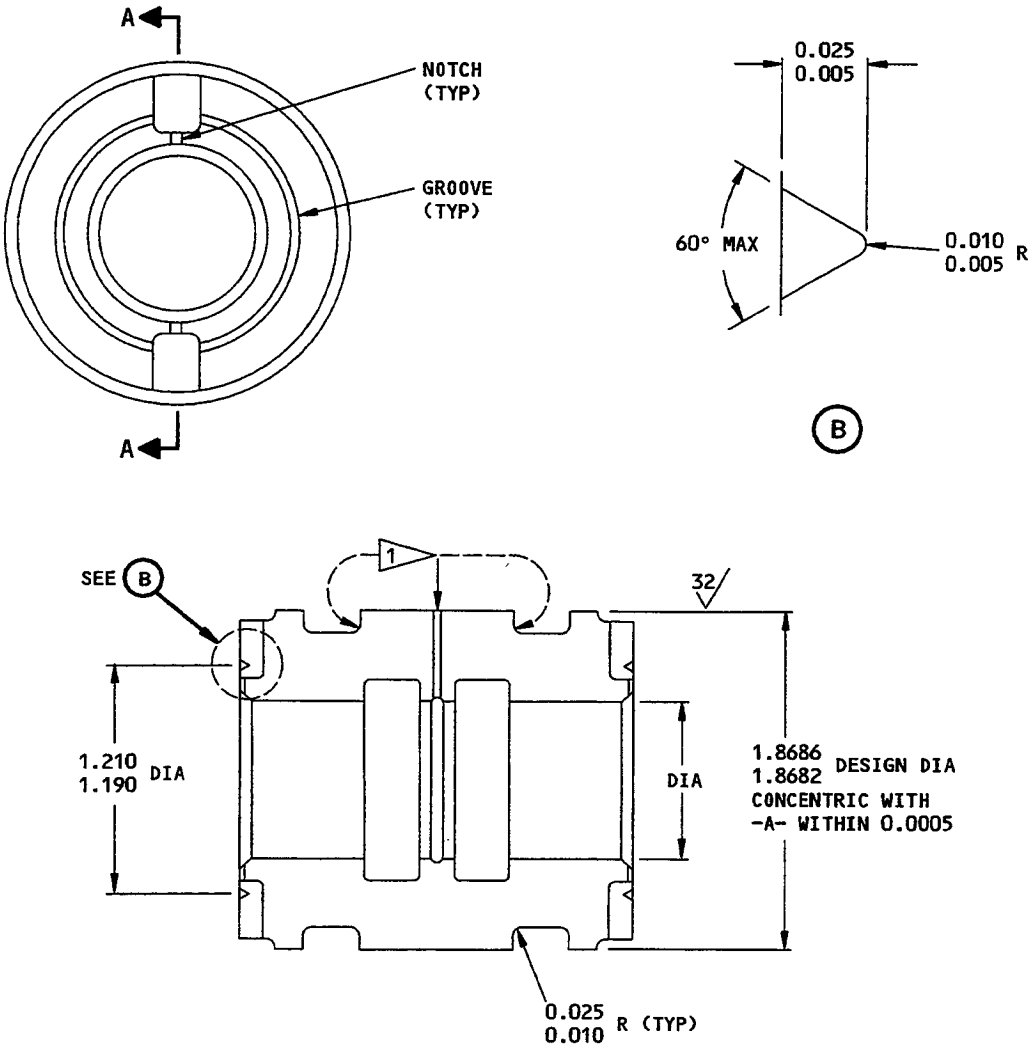


REFINISH

CADMIUM PLATE SURFACES
NOTED BY 1

MATERIAL: AL–NI BRONZE PER AMS 4640

BEARING (10, 30, FIG 1103)



A-A

REFINISH

CADMIUM PLATE SURFACES NOTED BY 1

REPAIR

MACHINE GROOVES AND NOTCHES AS INDICATED (BOTH ENDS) TO ELIMINATE HYDRAULIC LOCK (REFER TO TESTING)

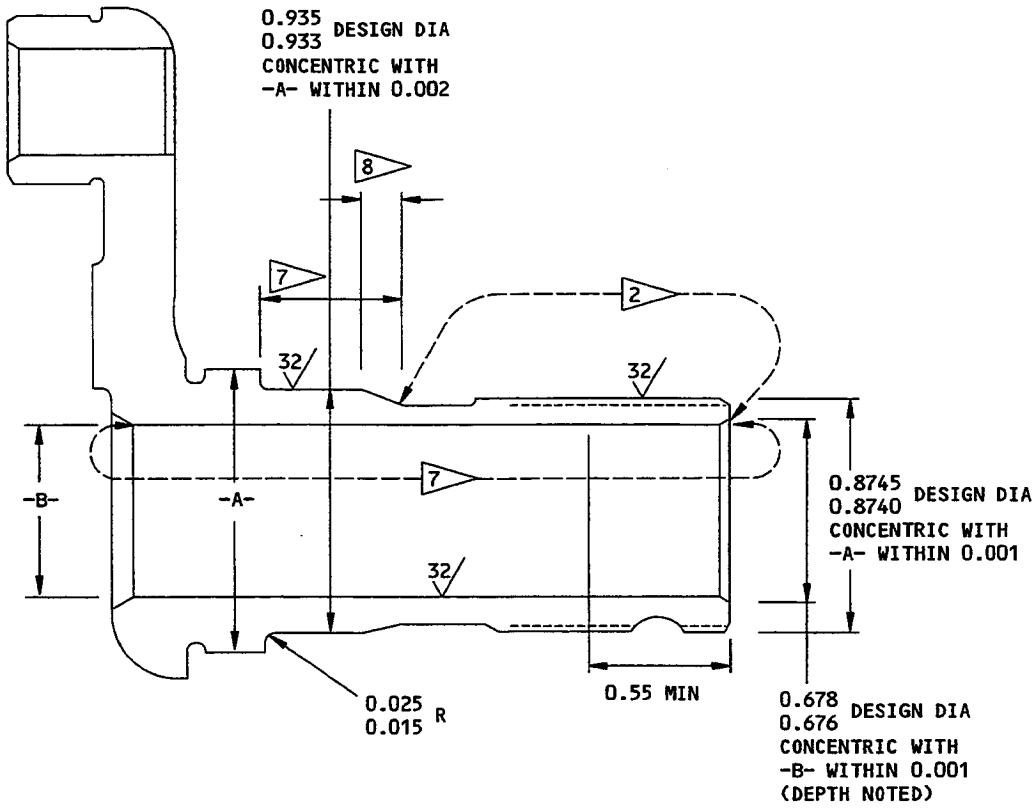
MATERIAL: AL-NI BRONZE PER AMS 4640

ALL DIMENSIONS ARE IN INCHES

BEARING (39, FIG. 1103)

Refinish Diagram
Figure 401A (Sheet 3)

F49801



REFINISH

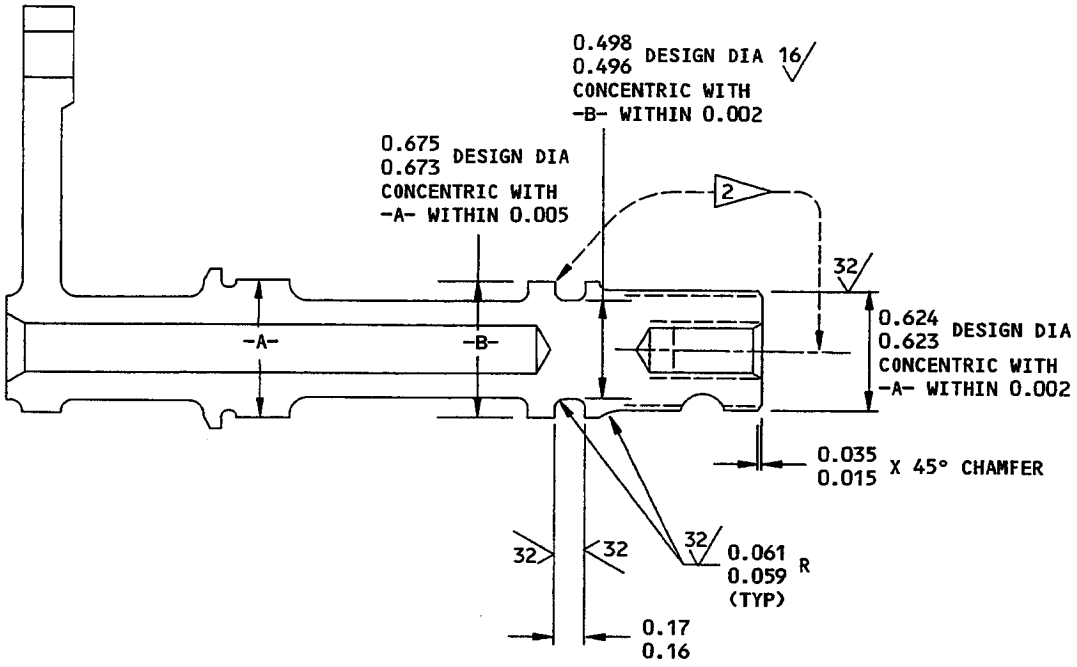
CADMIUM PLATE SURFACES NOTED BY 2

NICKEL PLATE SURFACES NOTED BY 7 AND 8

MATERIAL: 4340 STEEL (180-200 KSI)

CRANK (10, FIG. 1106)

Refinish Diagram
Figure 401A (Sheet 4)



REFINISH

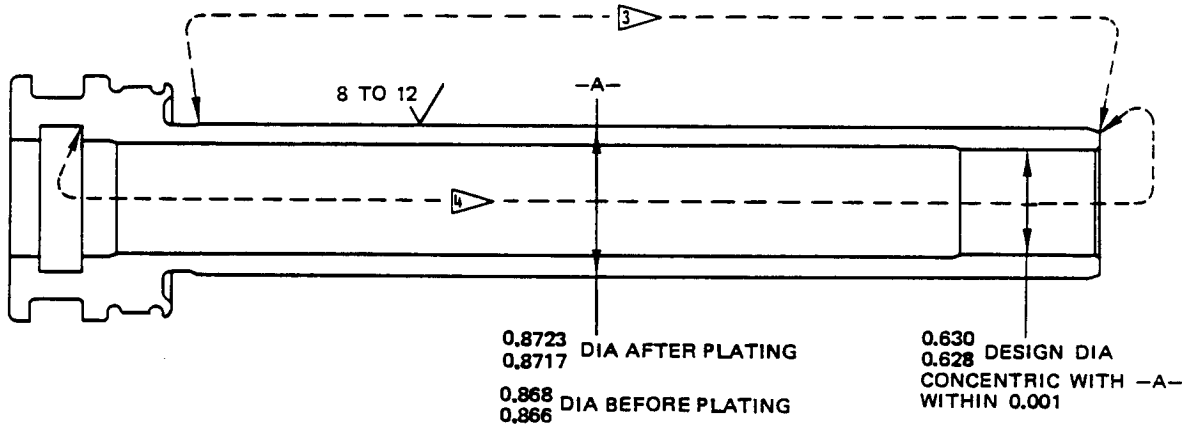
CADMIUM PLATE SURFACES NOTED BY 2

MATERIAL: 4340 STEEL (180-200 KSI)

CRANK (11, FIG. 1105)

Refinish Diagram
Figure 401A (Sheet 5)

F49882



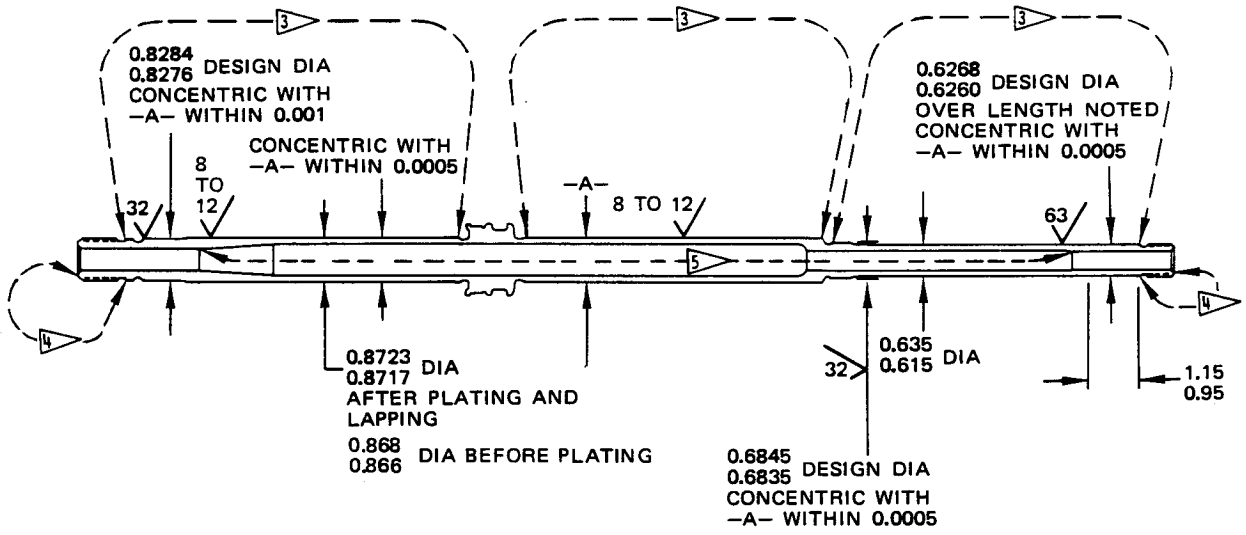
REFINISH

CHROME PLATE DIA -A- PER 3

CADMIUM PLATE SURFACES NOTED BY 4

MATERIAL: 4340 STEEL (180-200 KSI)

PISTON (14, FIG 1103)

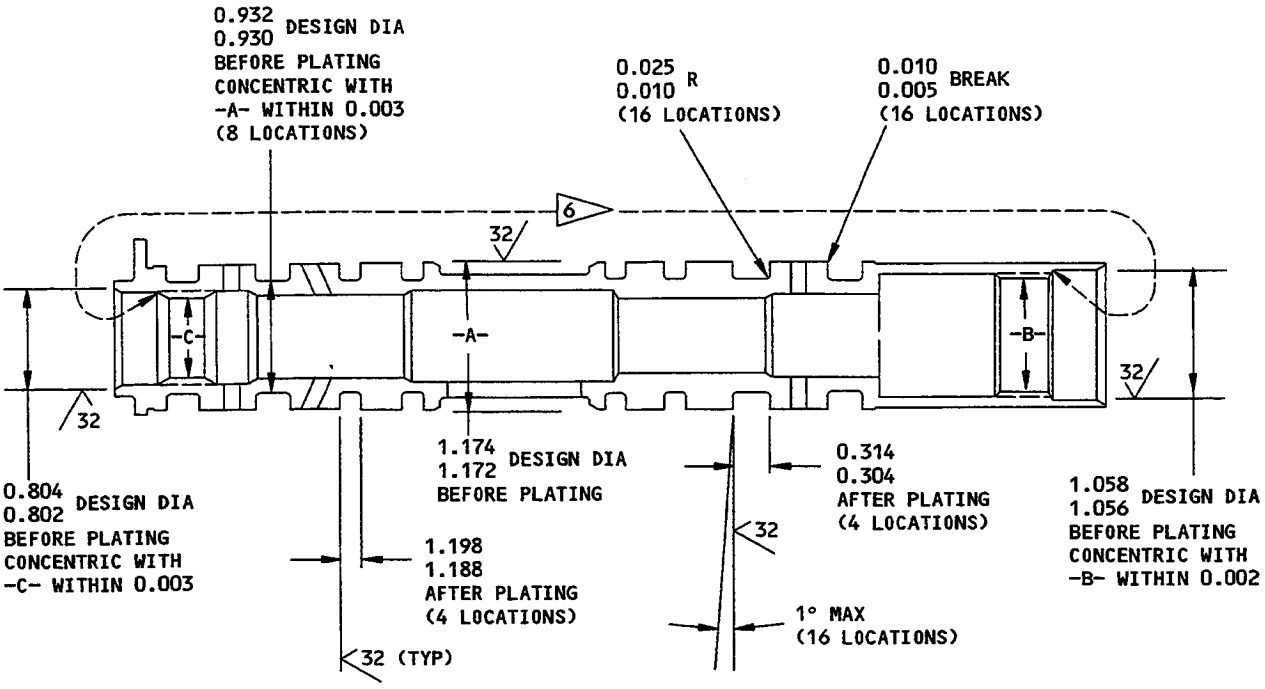


REFINISH

CHROME PLATE DIAMETERS NOTED BY 3. CADMIUM PLATE SURFACES NOTED BY 4. CADMIUM PLATE AND APPLY PRIMER ON SURFACES NOTED BY 5

MATERIAL: 4340 STEEL (180-200 KSI)

AFT PISTON (34, FIG 1103)



REFINISH

ELECTROLESS NICKEL PLATE SURFACES NOTED BY 6 OPTIONAL IN HOLES AND SLOT

ALL DIMENSIONS ARE IN INCHES

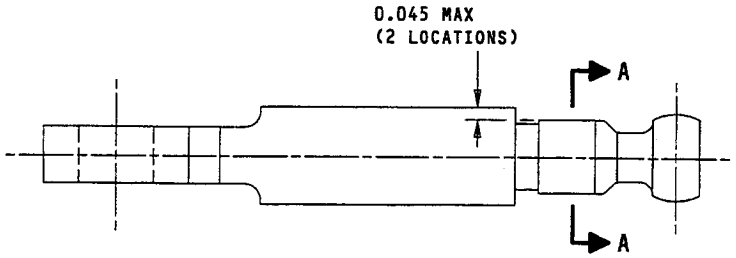
MATERIAL: NITRIDED STEEL, NITRALLOY 135
MODIFIED PER MIL-S-6709A, COND F4

1. CADMIUM PLATE (F-4.201) 0.0003 PLATING THICKNESS
2. CADMIUM PLATE (F-15.02) 0.0002-0.0004 PLATING THICKNESS
3. CHROME PLATE (F-15.03)
4. CADMIUM PLATE (F-15.06) 0.0003 PLATING THICKNESS
5. APPLY TWO COATS PRIMER (SRF-12.206) BMS 10-11, TYPE 1
6. ELECTROLESS NICKEL PLATE (F-1.803) 0.0015-0.0017 PLATING THICKNESS
7. NICKEL PLATE (F-14.19) 0.003-0.004 PLATING THICKNESS
8. NICKEL PLATE RUNOUT AREA

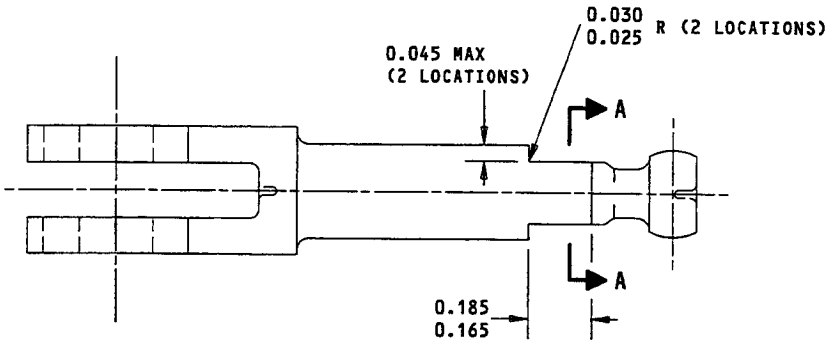
SLEEVE (19, FIG. 1110)

Refinish Diagrams
Figure 401A (Sheet 8)

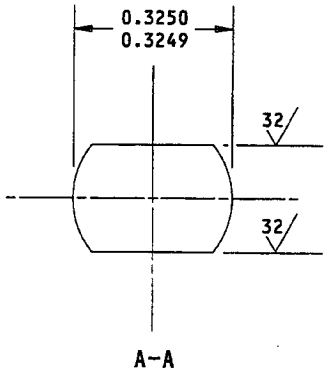
F49928



SEGMENT (9, FIGURE 1106)

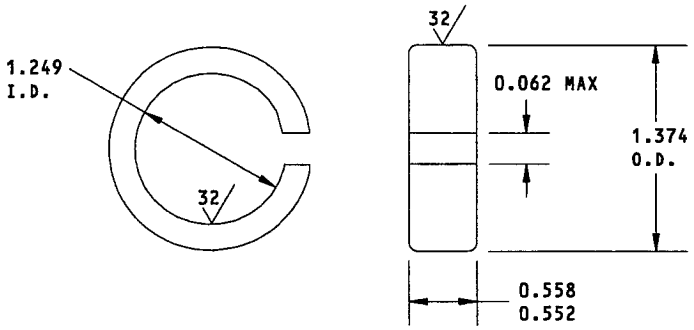


SEGMENT (10, FIGURE 1106)



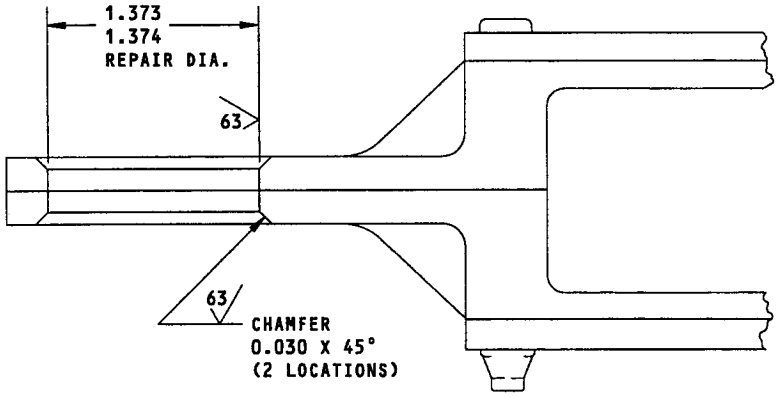
Refinish Diagrams
Figure 401B

B04720



MATERIAL: 6061-T6 AL ALLOY

FABRICATED SPLIT SLEEVE FOR SUMMING LEVER ASSEMBLY



ALL DIMENSIONS ARE IN INCHES

Summing Lever Assembly Repair
Figure 401C

C16546

4. Replacement

A. Replace al 1 packings, gaskets, seals and parts found unserviceable, damaged beyond simple repair, or worn in excess of wear limits shown in Fig. 601.

NOTE: Refer to Materials in par. 5 for repair material required.

B. Replacement of Components for Power Control Unit Assembly (Fig. 1101)

(1) Nameplate (71):

(a) Remove nameplate, using a suitable knife or equivalent.

NOTE: Removal may be facilitated by brushing methyl ethyl ketone along adhesive parting line as nameplate is pried loose.

(b) Clean faying surfaces, and bond new plate (71) to assembly, per 20-50-12, Type 38, special method I.

NOTE: Position as shown in Fig. 1101.

(c) On unit which uses steel sleeved manifold(s), stamp SS on nameplate after serial number.

(2) Replace parts of valve assembly (59) as follows:

(a) Remove cage (63) from seat (60) by machining as shown in Fig. 402.

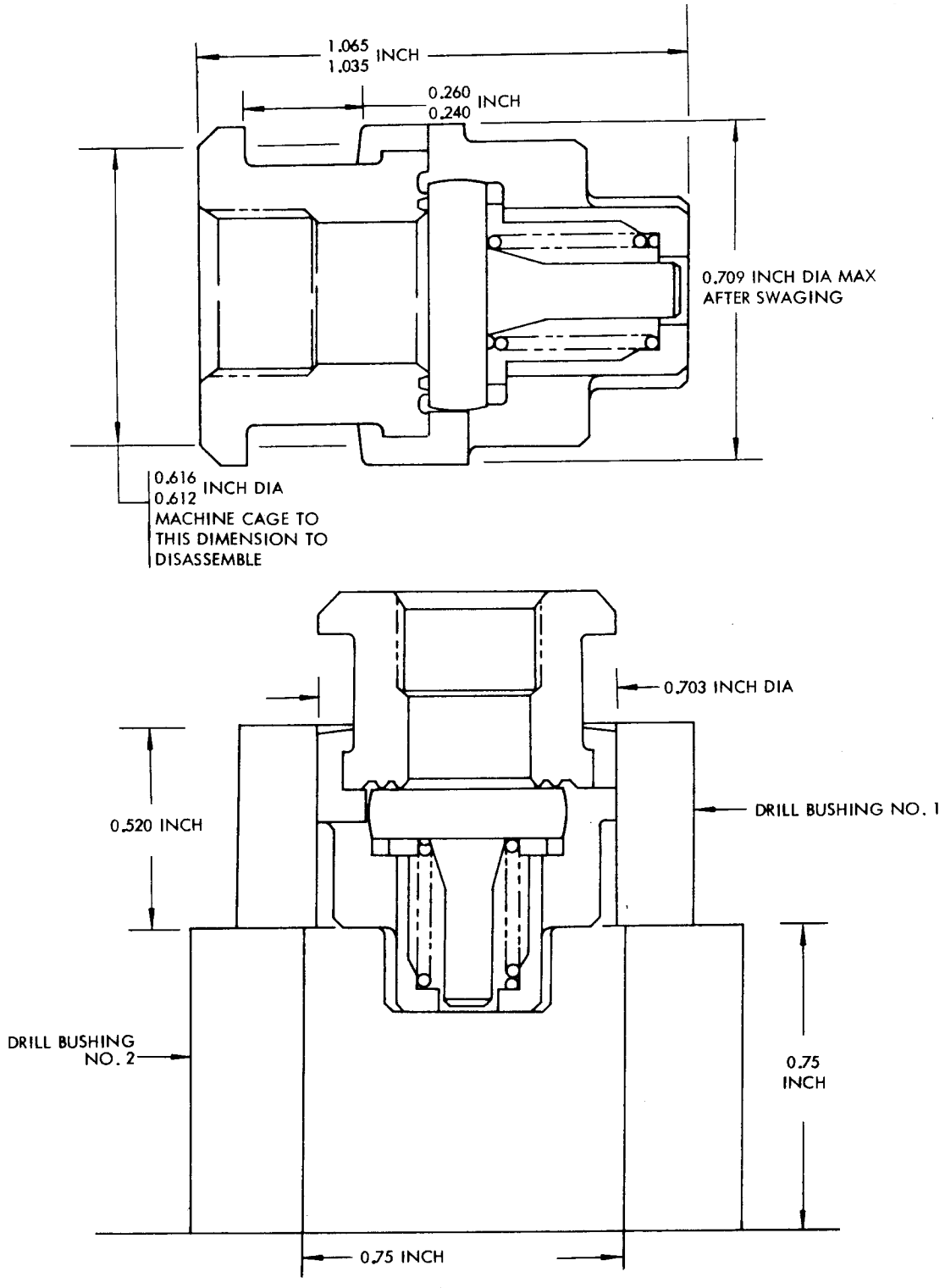
(b) Remove poppet (61) and spring (62).

(c) Replace defective parts.

(d) Position cage (63) spring (62) poppet (61) and seat (60) on drill bushings as shown in Fig. 402.

(e) Swage cage (63) to seat (60) by pressing cage below flush into drill bushing No. 1. Swaged assembly dimensions must be as shown on Fig. 402.

(f) Apply F-2.940 by brush to scuffed areas caused by swaging.



VALVE ASSEMBLY
(59, FIGURE 1101)

Replacement Details for Check Valve Assembly
Figure 402

C. Auxiliary Manifold Assembly (Fig. 1102).

(1) Replace electrical components as follows: (Fig. 403 for wiring diagram.)

(a) Remove lockwire, and screws (1), releasing receptacle (2).

(b) Remove potting compound from receptacle (2).

(c) Using Contact Tool, Amphenol Borg Electrical Corp., Part Number 294-89, extract pins (3) and plug (4) in accordance with 20-11-02.

(d) Remove retainer (5), using small tool steel chisel, releasing plug assembly (6).

CAUTION: BE VERY CAREFUL TO AVOID DAMAGE TO MANIFOLD (17).

(e) Remove potting compound from plug assembly (6).

(f) Use contact tool Part Number 000407-0004, Viking Industries, to extract pins (8) from shell (7).

(g) Using a handheld twist drill or equivalent , carefully remove wires (9) and potting compound from cavities in manifold (17).

NOTE: A suitable rotary wire brush may be used to remove traces of compound from cavities.

CAUTION: USE CARE TO PREVENT DAMAGE TO MANIFOLD (17).

(h) Remove loose particles of potting compound by blowing with clean dry, 25 psi compressed air.

(i) Using Contact Crimp Tool, Viking Industries Inc., Part Number 000407-0001, crimp pins (8) to wires (9) per 20-11-02.

(j) Install tubing (10) on each pin (8) per 20-11-02.

(k) Using Contact Insertion Tool, Viking Industries, Inc., Part Number 000407-0003, insert pins (8) in shell (7).

(l) Plug the blank hole C of solenoid valve connector "C" with pin (8).

(m) Insert wiring and plug assemblies (6) into applicable cavities in manifold (17).

(n) Bring ends of wiring for receptacle (2 and 3) out through the receptacle mounting hole.

(o) Trim wires to project approximately two inches beyond receptacle mounting face.

(p) Using Contact Crimp Tool, Amphenol Borg Electrical Corp., Part Number 294-90, secure wires (9) to pins (3). Using Contact Insertion Tool, Part Number 294-88, insert pins (3) and plug (4) in receptacle (2) in accordance with 20-11-02.

(q) Perform wiring continuity and dielectric strength test in accordance with TESTING steps 11.A. and 11.C.

(r) Upon successful completion of continuity and dielectric strength test, install retainers (5) with concave side next to manifold.

(s) Using Assembly Tool, Part Number AT59140, press retainer (5) flat to secure plug assembly (6).

(t) Secure receptacle (2) with screws (1).

NOTE: Orient receptacle index key to the right as viewed facing receptacle (2).

(u) Apply potting compound (Method I)

1) Clean faying surfaces using methyl ethyl ketone.

2) Remove all loose foreign material using clean dry compressed air.

3) Blend compound RTV 21, 200 parts resin to 1 part dibutyl tin dilaurate (DBT) catalyst by weight.

4) Deaerate compound (pot life approximately 1 hour).

5) Inject RTV 21 potting compound in cavities of manifold. Cavities must be completely filled with no voids. Excess compound must be wiped flush to outer surface of unit.

6) Cure compound 24 hours at room temperature. Optional accelerated cure -- 2 hours at room temperature and 5 hours at 150°F (50 percent relative humidity).

(v) Apply potting compound (optional, Method II)

1) Clean faying surfaces using methyl ethyl ketone.

2) Remove all loose foreign material using clean dry compressed air.

3) Apply several turns of self-vulcanizing silicon rubber insulation tape to the wire bundle between the ends near the pins to approximately 1/4-1/2 inch beyond the support clamp.

4) Install the backshell, tighten it, and tighten the support clamp bolts.

5) Apply RTV 3145 sealant into the open space between the backshell body and the support clamp around the wire bundle.

(2) Replace pins (11, 13) and plugs (12, 14) as required in accordance with 20-50-04.

(3) If inserts (15 or 16) require replacement:

(a) Remove insert (15 or 16). Clean and check threads in threaded hole.

(b) Apply BMS 10-11, Type 1 primer to new insert and threaded hole. While primer is wet, install insert with top coil 3/4 to 1-1/2 turns below top surface of hole. Remove tang.

D. Cover Assembly (Fig. 1102A)

(1) Replace electrical components (Ref 20-11-02) (Fig. 403A for wiring diagram):

(a) Deleted.

(b) Remove fasteners (5, 6, 7), releasing receptacles (9).

NOTE: Note position of major index key on receptacle for installation.

(c) Remove potting compound from receptacles and plug (11).

(d) Using contact tool, 294-89, extract pins (12) and plugs (13) from receptacles and plug.

NOTE: A suitable rotary wire brush may be used to remove traces of compound from cavities.

(e) Blow out loose particles of potting compound with clean, dry, 25-psi compressed air.

(f) Using contact crimp tool, 294-90, crimp pins (12) to wires (16, 15).

(g) Install wiring in sleeving (14).

(h) Insert pins (12) in receptacles (9) and plug (11) with contact insertion tool, 294-88.

(i) Perform wiring continuity and dielectric strength test per TESTING, steps 11.A., 11.C.

(j) Apply potting compound per par. 4.C.(1), filling cavities in receptacles (9) and plug (11).

(k) Install receptacles (9) in bracket (18) with fasteners (7, 6, 5).

NOTE: Position index key in position noted on disassembly.

E. Cylinder Assembly Buildup (Fig. 1103)

(1) Bearing (23) replacement: Method 1 -- Remove old bearing and replace with new BACB10C94H bearing. Bearing may be replaced only once using the following procedures.

(a) Press bearing out of rod end assembly. Use care not to damage the existing swaged material.

(b) Visual and magnetic particle check rod end (Ref 20-20-01).

(c) Check that bore diameter is 1.9365-1.9370 inches at 2 places 90° apart.

(d) Bearing bore may be repaired, if required, by machining bore I.D. to 1.9570 inches max. and nickel plating per 20-42-09 par. C., then machining to the original design dimension of 1.9365-1.9370 inches. Use care to avoid damage to the swaged side of bearing bore during repair. If swaged lip is damaged and insufficient material remains to restake, refer to Method 2 bearing replacement.

(e) Insert new bearing into the same side of rod end as the old bearing was removed. Position bearing in full contact with the swage material.

(f) Roller stake entry side of rod end per 20-50-03, type 2. If rod end was repaired and does not have adequate swage material on the non-entry side, restake that side also per 20-50-03, type 2.

(g) Check that swage rings are fully seated against bearing chamfers around the entire circumference of the bearing.

(h) Manually check that no bearing looseness exists in either axial or radial direction.

(2) Bearing (23) replacement: Method 2 -- Remove old bearing and replace with DAS10-31A1-505 swageable roller bearing.

(a) Press bearing out of rod end assembly.

(b) Visual and magnetic particle check rod end (Ref 20-20-01).

(c) Check that bore diameter is 1.9365-1.9370 inches at 2 places 90° apart.

(d) Bearing bore may be repaired, if required, by machining bore I.D. to 1.9570 inches max. and nickel plating per 20-42-09 par. C., then machining to the original design dimension of 1.9365-1.9370 inches.

(e) Chamfer rod end bore to 0.030-0.035 inch by 45°.

(f) Brush cadmium plate exposed bore surface.

(g) Install new bearing into rod end and roller swage bearing per 20-50-03 except:

1) Use Rexnord, Inc. roller staking tool RST 2184.

2) Omit push-out load check.

(h) Visually check for nonuniformities or open lubrication passages.

F. Forward Manifold Assembly (Fig. 1104)

CAUTION: THOROUGHLY CLEAN MANIFOLD AND PASSAGES AFTER MACHINING TO REMOVE METAL PARTICLES.

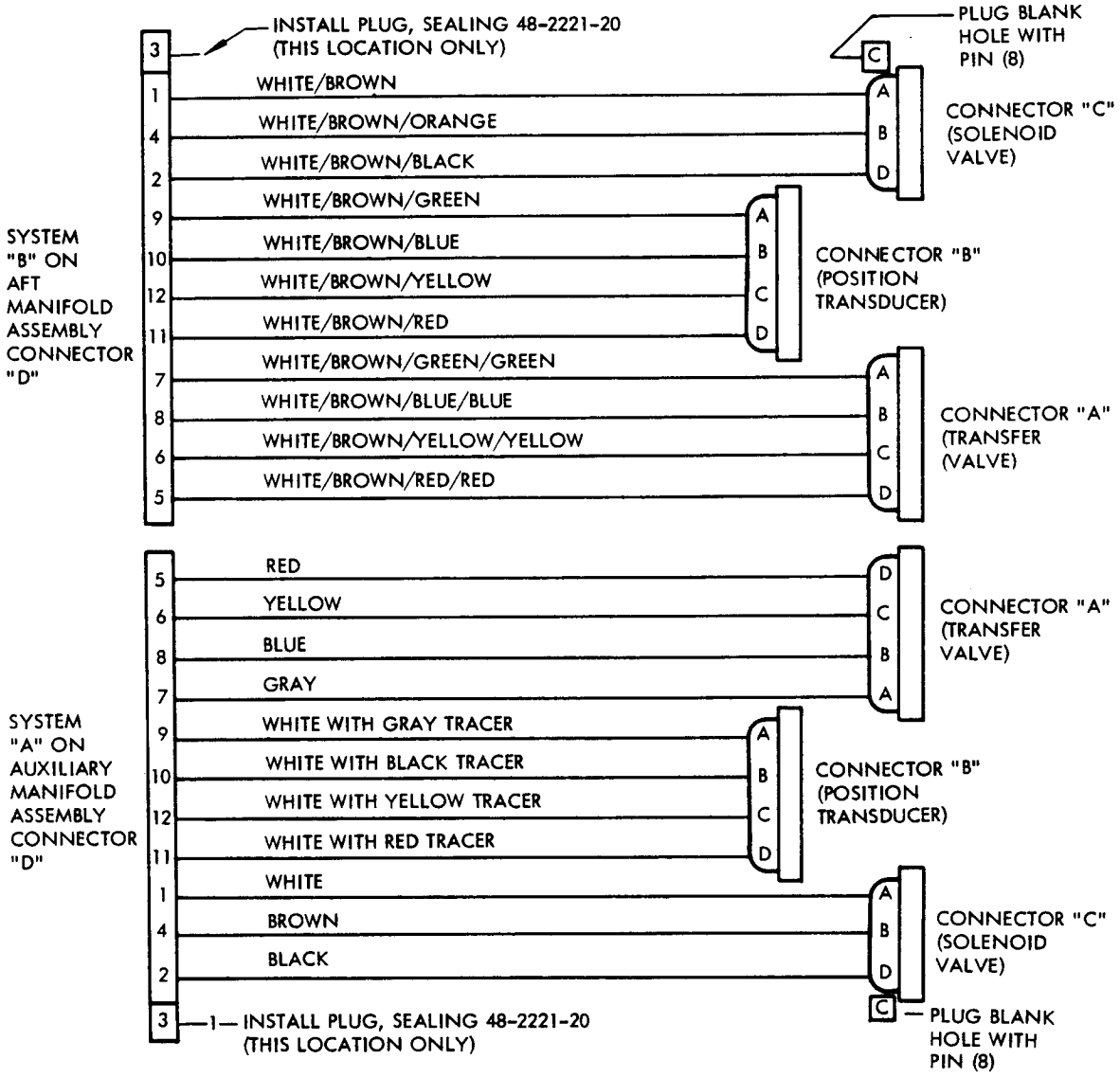
(1) Replace pins (1, 1A) and plugs (2, 2A) as required in accordance with 20-50-04.

(2) If bushings (3) require replacement:

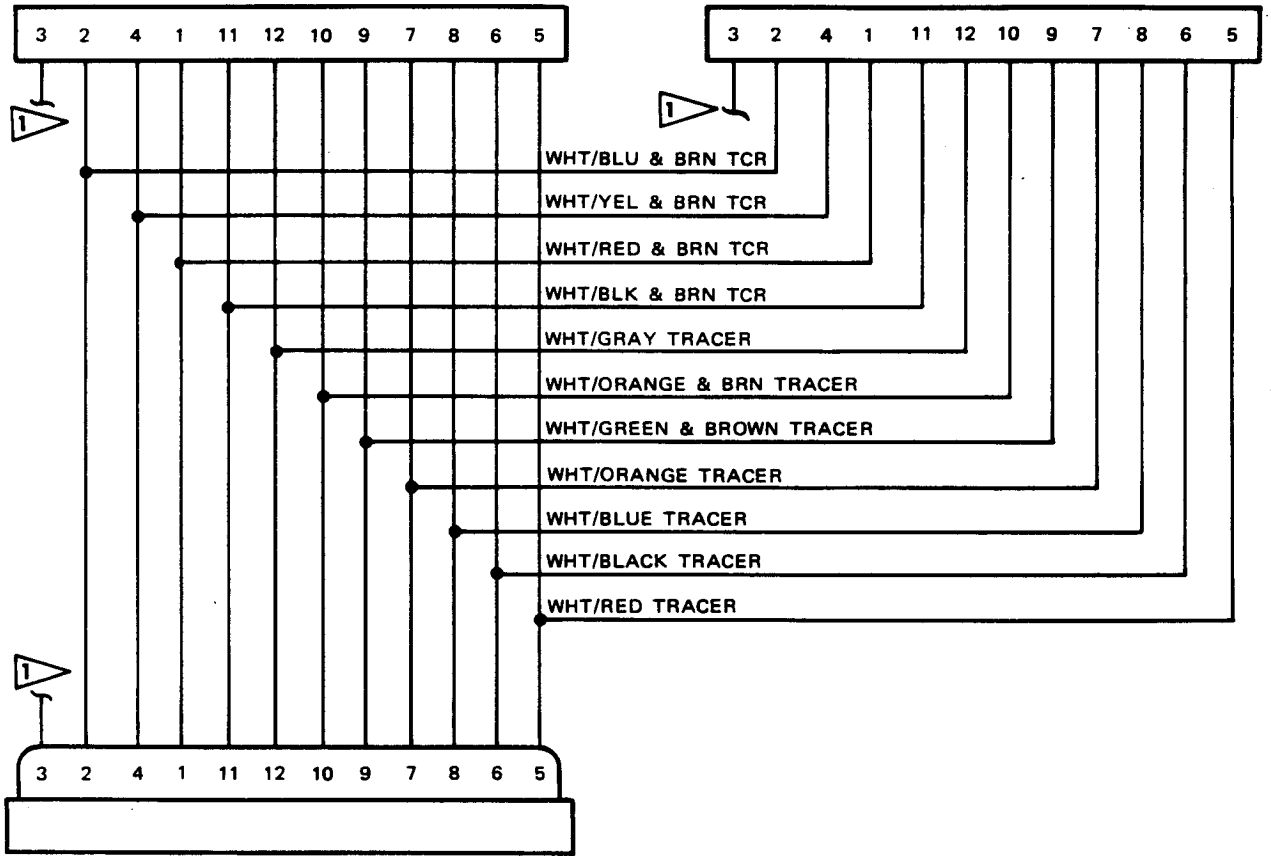
(a) Using a suitable press, remove bushings (3).

(b) Apply primer, BMS 10-11, Type 1 to faying surfaces of bushings (3) and install while primer is wet.

(c) Machine bushing bores to an inside diameter of 0.9995 to 1.0000 inch and 32-microinch finish.



NOTE: WIRE SPEC: MIL-W-16878 TYPE EE 24 GAGE, 19 STRAND



1 INSTALL SEALING PLUG (I3, FIG 1102A) THIS LOCATION

NOTE: WIRE SPEC: MIL-W-16878 TYPE EE 24 GAGE, 19 STRAND

65-54772-35 SYSTEM ON
COVER ASSEMBLY

NOTE: WIRE SPEC: 24 GAGE AWG WIRE, PER BMS 13-10 TYPE I, CLASS I

(3) Remove stop (4) and using stop assembly tool AT83343, press new stop into place in manifold (11).

(4) Replace manifold assembly (9) as a unit, as it is a bonded and machined assembly.

G. Crank, Link, and Summing Lever Assemblies (Fig. 1105)

(1) Replace crank assembly (9) composed of crank (10, 11), bearing (12), collar (13), bolt (14), lever assembly (15), sleeve (16), washer (17), lever (18, 19) as a complete unit. These are bonded and matched parts which must not be replaced separately.

(2) Replace bearings (12, 29, 30, 31) per 20-50-03.

NOTE: Bearing (31) installed in lever subassembly (LH) (37) is ball staked, six points. Bearing (31) installed in lever subassembly (RH) (37) is not staked.

(3) Replace bonded subassembly (34) as a unit. Do not replace individual parts.

(4) Replace bonded link assembly (41) as a unit. Do not replace individual parts.

H. Aft Manifold Buildup Components (Fig. 1106)

(1) Bearing (19) in lever assembly (18):

(a) Remove sheild and flush grease from bearing (19) in accordance with SOPM 20-30-01. Do not lubricate bearing (19).

(b) Install and roller stake bearing (19) in accordance with 20-50-03 except use staking dimensions in Fig. 404.

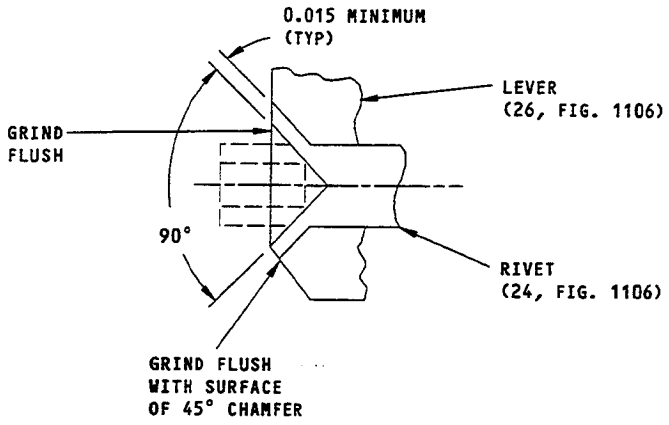
(2) Components of lever assembly (22):

(a) Install and roller stake bearing (23) per 20-50-03.

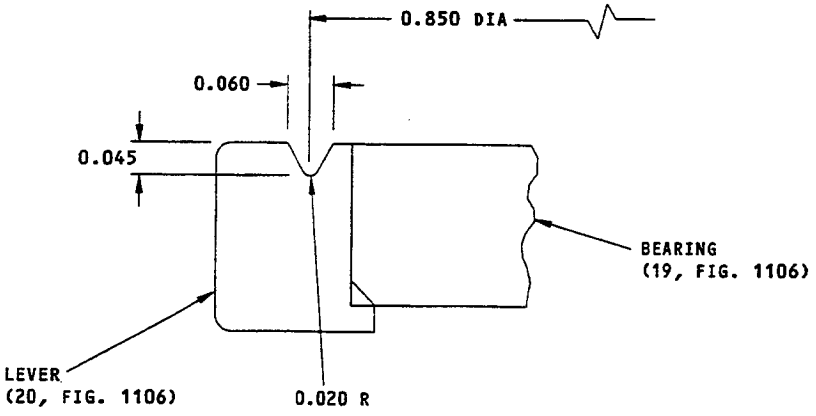
(b) Using a drill sharpened at 90 degrees, carefully remove swaged portion of rivet (24).

(c) Remove rivet (24) releasing roller (25).

(d) Install roller (25) and rivet (24). Swage rivet (24) and grind flush per Fig. 404.



RIVET SWAGING



ALL DIMENSIONS ARE IN INCHES

BEARING INSTALLATION

Replacement Details for Internal Summing Levers
Figure 404

I. Deleted

J. Valve Assembly (Fig. 1108)

NOTE: No special instructions are required. Refer to ASSEMBLY section.

K. Aft Manifold Assembly (Fig. 1109)

(1) Replace electrical components using the same procedures as used in par. 4.C.(1) except manifold item number is (23).

(2) Replace pins (11, 13, and 15) and plugs (12, 14, and 16) in accordance with 20-50-04.

(3) If inserts (17, 18, 19, and 21) require replacement:

(a) Remove insert (17, 18, 19 or 21). Clean and check threads in threaded hole.

(b) Apply BMS 10-11, Type 1 primer to new insert and threaded hole. While primer is wet, install insert with top coil 3/4 to 1-1/2 turns below top surface of hole. Remove tang.

(4) If necessary, remove stop (22) and using Stop Assembly Tool, AT83343 press new stop into place in manifold (23).

5. Materials

NOTE: Equivalents may be used for materials listed below.

A. Solvents.

(1) Federal Specification P-D-680 -- Source optional.

(2) Alcohol, Quakersol -- Commercial Solvents Corp., 260 Madison Avenue, New York, N.Y. 10016.

(3) Methyl Ethyl Ketone, Federal Specification TTM-261 -- Source optional.

(4) Methyl Alcohol, Grade B., Federal Specification M-232 -- Source optional.

(5) Paint Remover, Turco 4699 -- Turco Products Inc., 24600 S. Main, Los Angeles, California 90746.

(6) Perchloroethylene, Technical grade, Specification O-T-236 -- Source optional.

B. Lubricant

(1) Skydrol Assembly Lube MCS 352 -- Monsanto Company Inc., St. Louis Mo.

(2) Hydraulic Fluid, BMS 3-11 -- Source optional.

C. Abrasive compounds.

(1) Compound 2A(C) -- Clover Mfg. Company Inc., 333 Main Avenue, Norwalk Connecticut.

(2) Compound 2A(f) -- Clover Mfg. Company Inc., 333 Main Avenue, Norwalk Connecticut.

D. Adhesives

(1) Epon 901 with Catalyst B-1 -- Shell Chemical Co., 50 W. 50th., New York, N.Y. 10020.

(2) Deleted

E. Potting and Sealing Compounds

(1) Deleted

(2) Deleted

(3) Sealant, 30-121 -- Dow Corning Corp., S. Saginaw Road, Midland, Michigan.

(4) Potting Compound RTV 21 -- Dow Corning Corp., S. Saginaw Road, Midland, Michigan

F. Paints

(1) Chemical Resistant Paint, CAT-A-LAC, 443-3-6, Red -- Finch Paint and Chemical Company., 1536 W. 228th., Torrance, California, 90501.

G. Miscellaneous Materials

(1) Abrasive Cloth 220 grit, Federal Specification P-P-101 -- Source optional.

(2) Crocus Cloth, Federal Specification P-C-458 -- Source optional.

(3) Buffing Wheel, Federal Specification GG-W-301 -- Source optional.

(4) Gauze Sponge, 4 x 4 inches , 8 ply -- Source optional.

(5) Lockwire MS20995NC32

(a) MS20995NC32

(b) MS20995C32

(c) MS20995NC20

(d) MS20995C20

(6) Seals, Aluseal, 67 -- Stoffel Seal Corp., 68 Main Street, Tuckahoe, New York, 10707.

(7) Testing Fluids

(a) Skydrol 7000 -- Monsanto Chemical Company, St. Louis, Missouri.

(b) Fire Resistant Hydraulic Fluid, BMS 3-11 -- Source optional.

ASSEMBLY

1. General

A. Lightly lubricate all packings with fire resistant hydraulic fluid, BMS 3-11 or Skydrol Assembly Lube, MCS 352, before installation and install per Subject 20-50-06.

B. If necessary, trim the ends of packing backup rings to prevent excessive overlap.

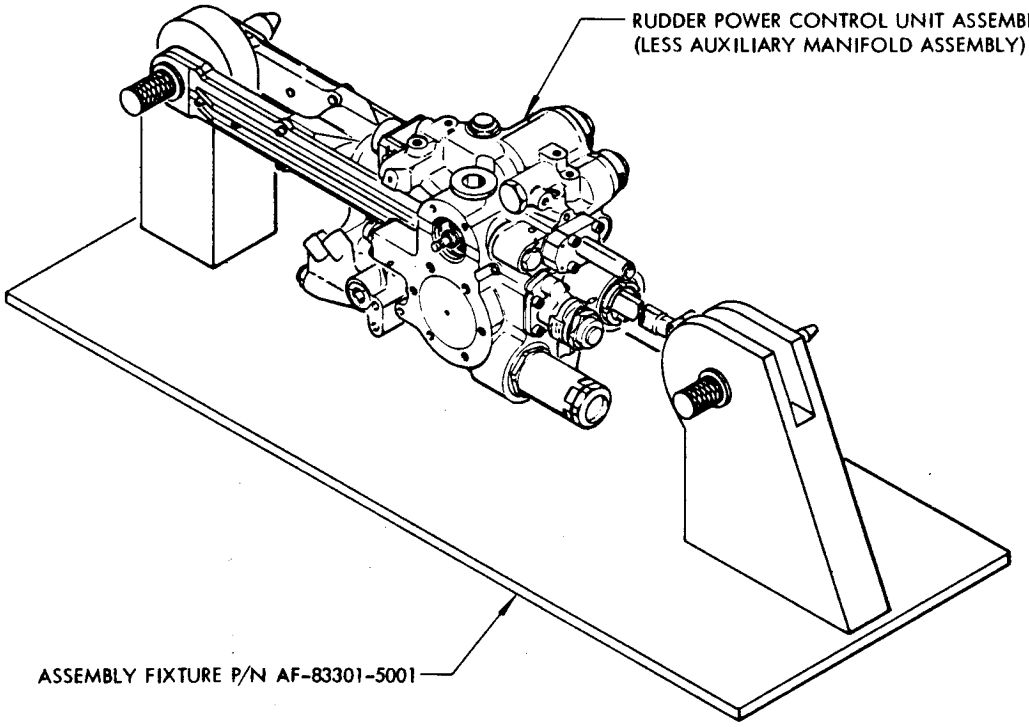
C. Protect hydraulic face sealing surfaces of components from damage during assembly.

D. Install ball bearings in accordance with Subject 20-50-03.

E. Using Chemical Resistant Paint, Catalac 443-3-6 red, paint torque stripe on all threaded parts which have torque range called in assembly.

F. Seal all lockwires using seals, Aluseal Number 67 or equivalent, on each pigtail.

G. Assembly Fixture, AF-83301-5001 or equivalent, should be used to facilitate assembly procedure. (See figure 501.)



Use of Assembly Fixture
Figure 501

2. Subassembly

A. Yaw Damper Actuator Assembly (Fig. 1110)

NOTE: Ensure that matched and serialized parts of this assembly are properly grouped.

(1) Install core (13) in piston (18), with core (13) extending beyond piston (18) by approximately 2.800 inches.

(2) Install spring (16) and retainer (15).

(3) Use collet retracting tool, AT59138 or equivalent, to depress retainer (15) and to install rings (14) as shown on Fig. 502.

(4) Remove tool, allowing retainer (15) to seat on rings (14).

(5) Install retainer (9), spring (8), and retainer (7).

(6) Depress retainer (7) and install pin (6).

(7) Lubricate the surface of piston (18) with hydraulic fluid, BMS 3-11, or Skydrol Assembly Lube, MCS 352, and slide piston (18) into sleeve (19).

(8) Install spring (5), rings (4), and packing (3).

(9) Install cap (2), tighten to a torque range of 200 to 250 lb-in.

(10) Set length of core (13)(Fig. 502).

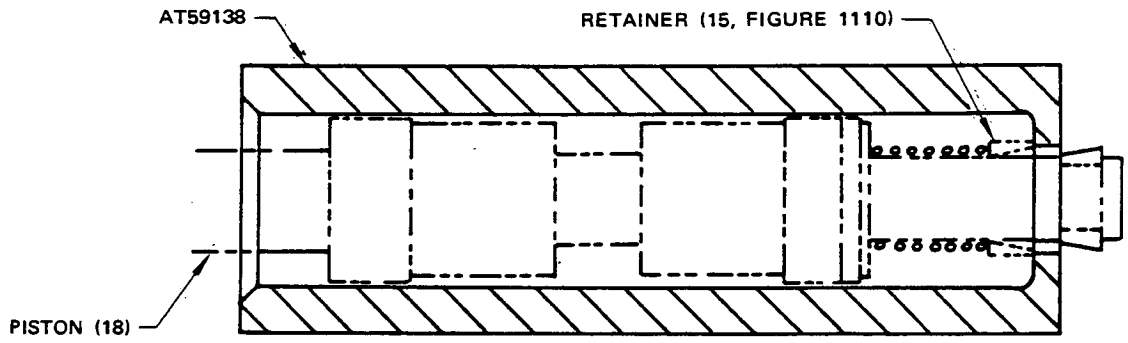
NOTE: This is starting point, and is subject to adjustment to meet functional tests.

(a) Slide holding tool AT59196-5 over core (13) with holding lugs engaging slots in end of piston (18).

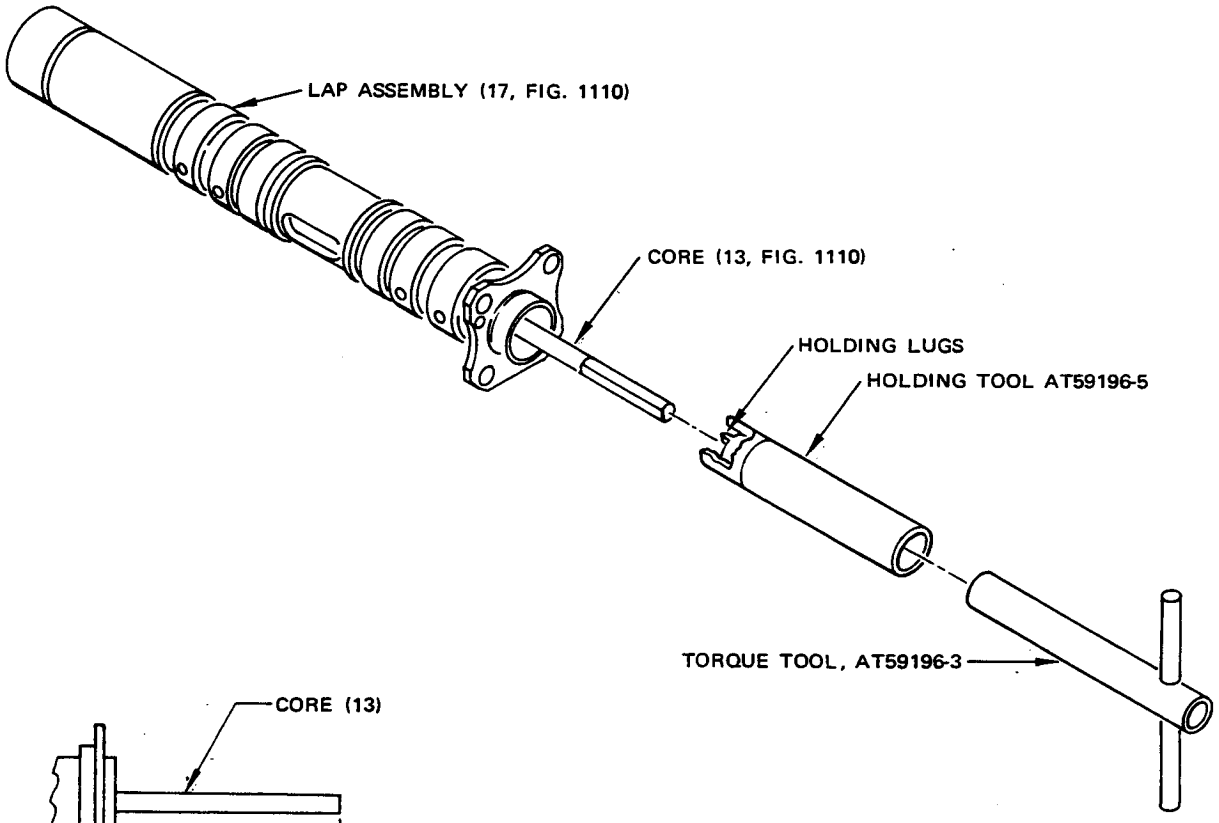
(b) Using torque tool AT59196-3, adjust core (13) to a length of 2.5990 to 2.6004 inches. Check length using setting gage TF59196-105.

(11) Install rings (12), packing (11), and diaphragm (10). Temporarily protect and identify assembly. If wire is used to seal protective bag, use corrosion resistant coated low alloy steel tag wire.

(12) Place actuator assembly (27, Fig. 1101) with its mating, tagged transducer.



USING COLLET RETRACTING TOOL AT59138



ADJUSTING CORE (13)

B. Assemble Dual Servo Valve Assembly (Fig. 1108)

NOTE: Do not interchange components of the dual servo valve assemblies because the valve assemblies contain matched parts.

Ensure that serialized parts of lap assembly are properly grouped.

CAUTION: EXERCISE CARE WHEN HANDLING COMPONENTS OF LAP ASSEMBLY (12) TO PREVENT DAMAGE TO CRITICAL LAPPED SURFACES.

(1) For valve assemblies (68010-5003, -5005, -5007):

a) Install guide (10), spring (9), and guide (8) on insert assembly (13).

b) Using servo retainer assembly tool, depress guide (8) and install retainer (7) in insert assembly (3).

c) Tighten retainer (7) to a torque range of 25 to 30 lb-in. Release guide (8) and verify retainer (7) is locked. If retainer is not locked, depress guide (8) and continue torqying until retainer (7) is locked into guide (8). Do not exceed 150 lb-in of torque on retainer (7).

d) Wet outside surface of insert assembly (13) with hydraulic fluid BMS 3-11 and slide carefully into insert assembly (15). Make sure slot of guide (10) aligns with pin (11).

e) Install guide (6), spring (5), and pin (4) in retainer (7).

f) Install packing (2) on cap (1).

g) Install spring (3) and cap (1) in insert assembly (15).

h) Tighten cap (1) to a torque range of from 15 to 25 pound-inches.

i) Wet sliding surface of slide (14) with hydraulic fluid BMS 3-11 and install carefully in insert assembly (13) completing lap assembly (12).

(2) For valve assemblies (398310-1001, -1003):

a) Install guide (10), spring (9), and guide (8) on slide (13).

b) Assemble guide (4), spring (5) and guide (6) and install in slide (13).

c) Use servo pin assembly tool 398310-AT4 to depress guides (4, 8) and install pin (16) through slide (13).

d) Wet outside surface of slide (13) with hydraulic fluid BMS 3-11 and slide carefully into body assembly (15). Make sure slot in guide (10) aligns with pin (11G).

e) Install packing (2) on cap (1).

f) Install spring (3) and cap (1) in body assembly (15).

g) Tighten cap (1) to a torque range of from 75 to 80 pound-inches.

h) Wet sliding surface of slide (14) with hydraulic fluid BMS 3-11 and install carefully in slide (13) completing lap assembly (12).

C. Deleted

D. Assemble Aft Manifold Buildup. (Fig. 1106)

(1) Install actuator assembly (27, Fig. 1101)

(a) Install rings (26) and packings (25) on lap assembly (17, Fig. 1110).

(b) Install lap assembly (27, Fig. 1110) in manifold assembly (54, Fig. 1103).

(c) Paint underside surface of the head of screw (24) with primer and install screw (24) immediately. Do not allow paint on screw threads. Tighten screw to a torque range of 5 to 8 lb-in.

(d) Tighten diaphragm (10, Fig. 1110) until it bottoms, then back off to align hex flats with socket in transducer assembly (1, Fig. 1110). Clearance between underside of head of nut on diaphragm and end of lap assembly sleeve (19, Fig. 1110), must not exceed 0.006 inch.

(e) Apply a light coating of grease to cavity of transducer assembly (1, Fig. 1110) and to faying surface of manifold. Install packing (23) and slide transducer assembly over diaphragm. Install screws (22) and tighten to 25-35 lb-in. After completion of testing a lockwiring of screws (22), wipe off excess grease and clean contact area between manifold and transducer assembly, around diaphragm and screws with solvent. Apply a bead of sealant to contact area between manifold and transducer assembly, between transducer assembly and diaphragm, and around screws and allow to cure. Check that sealant has bonded to the surfaces.

(2) Install bearing (31), seal (28), packing (29), and bearing (27).

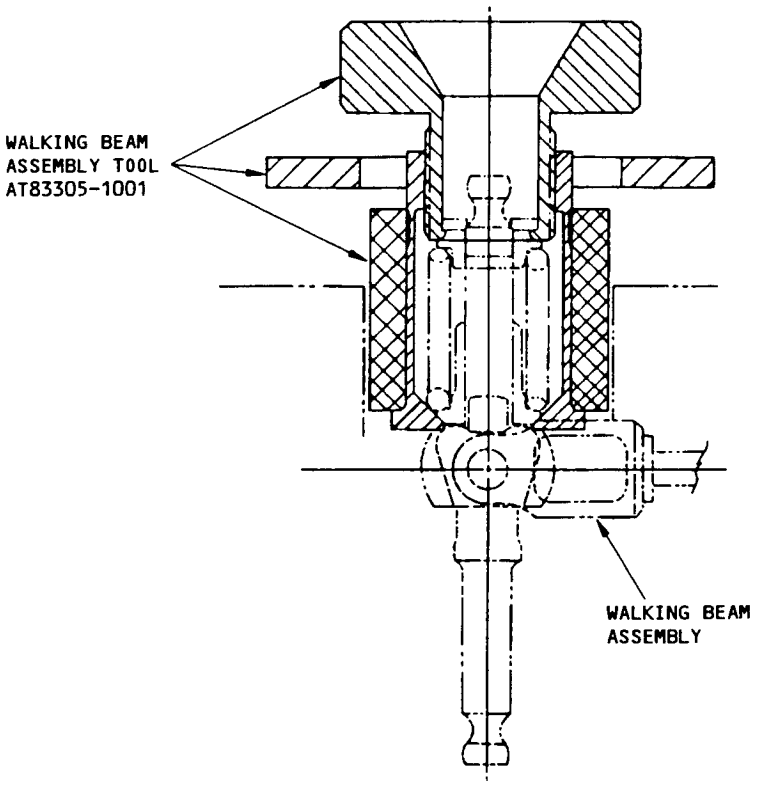
(3) Install crank (10, Fig. 1105) with shaft extending through bearings (27, 31).

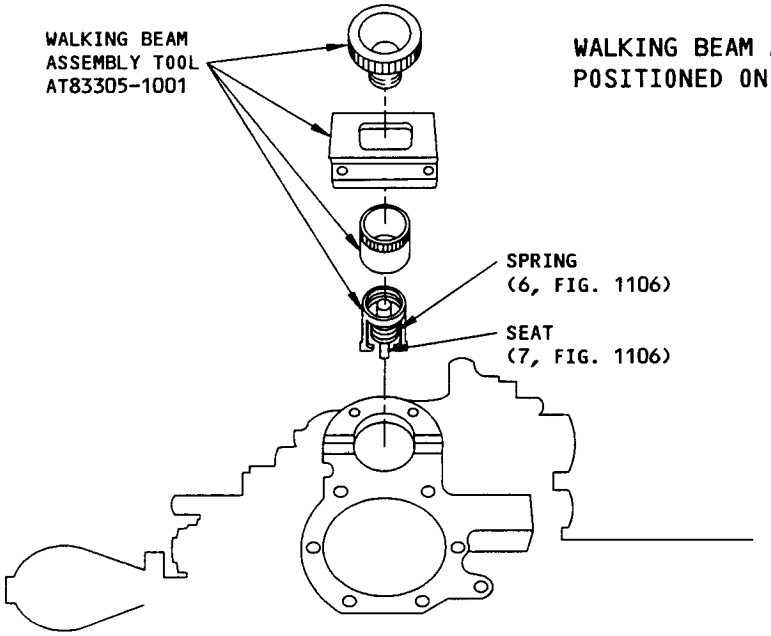
(4) Install lever assembly (22) by sliding through the lower opening of aft manifold, and seat bearing (23) on crank (10, Fig. 1105).

(5) Install packings (12, 41, 42).

NOTE: Do not interchange components of the dual servo valve assemblies (40) because the valve assemblies contain matched parts.

(6) Prepare valve assembly (40) by removing parts (1 thru 10, Fig. 1108) and pulling insert assembly/slide (13, Fig. 1108) so it extends toward lever assembly (22, Fig. 1106).





WALKING BEAM ASSEMBLY TOOL
POSITIONED ON WALKING BEAM

Assembly Details, Walking Beam Assembly (3)
Figure 503

F57714

(7) Place valve assembly (40) in manifold assembly (54, Fig. 1103) engaging insert/slide (13, Fig. 1108) on roller (25) of lever assembly (22).

(8) Lay manifold on its side, with lever assembly (22) in horizontal position.

(9) Drop bolt (21), head down, through hole in crank (10, Fig. 1105) and into cavity in manifold (54, Fig. 1103).

(a) For power control units that use bolt (21, 66-22749-1) only: If bolthead will not fit through hole in crank, machine bolt (21, 66-22749-1) head diameter to 0.375-0.385. Maintain original bevel and a finish of 125 microinches.

(10) Install lever assembly (18) through port closed by cap (1).

(11) Mate lever assembly (18) with lever (22) and slide (14, Fig. 1108).

(12) Through port provided for walking beam assembly (3), position fork (11) with shaft extending into port provided for guide (38).

(13) Slide segments (9, 10) between legs of fork (11), and position segments in top ends of levers (18, 22).

(14) Thread a 4-40 screw of suitable length into the end of pin (8). Using screw as a handle insert pin (8) through holes in fork (11) and segments (9, 10). Remove screw.

(15) Using assembly tool AT83305-1001, install seat (7), spring (6), and guide (5) as shown in Fig. 503. Secure guide (5) with retainer (4).

(16) Install packing (17).

(17) Install crank (11, Fig. 1105). Align hole in throw of crank (11) with bearing (19).

(18) Using a suction tube or equivalent pull bolt (21) through center of bearing (19) and hole in throw of crank (11).

(19) Using suitable driver install collar (16) on bolt (21).

(20) Install guide (38), spring (37), and guide (36).

(21) Depress guide (36) and install pin (35).

(22) Install spring (34), packing (33) on cap (32). Thread cap to engage approximately 2 threads and apply a light coating of grease to exposed threads of cap. Tighten cap to 40-50 lb-in.

(23) Install packing (2) on cap (1). Thread cap to engage approximately 2 theads and apply a light coating of grease to exposed threads of cap. Tighten cap to 40-50 lb-in.

(24) Install rings (15), packing (14), and cap (13).

(25) Thread nut (39) to engage approximately 2 threads and apply a light coating of grease to exposed threads of nut. Using assembly tool AT68053-1001, tighten nut to 550-650 lb-in.

(26) Install the following parts removed in par. 2.D.(6) (Fig. 1108).

NOTE: Do not interchange components of the dual servo valve assemblies because the valve assemblies contain matched parts.

(a) For valve assemblies (68010-5003, -5005, -5007):

1) Place guide (10), spring (9), guide (8), and retainer (7) in position on insert assembly (13). Make sure slot in guide (10) aligns with pin (11).

2) Move input lever (34, Fig. 1105) in the direction of an extend command until the crank (15, Fig. 1105) contacts the manifold stop. Secure this position by wedging a nylon rod between the crank and the opposite manifold stop.

3) Using servo retainer tool, depress guide (8), and tighten retainer (7) to a torque of 25-30 lb-in. Release guide (8) and verify retainer (7) is locked. If retainer is not locked, depress guide (8) and continue to torque until retainer (7) is locked into guide (8). Do not exceed 150 lb-in of torque on retainer (7).

NOTE: Verify corners of retainer (7) and the scallop cuts of guide (8) are undamaged after retainer (7) is torqued, and proper locking engagement is achieved.

4) Install guide (6), spring (5), and pin (4) in retainer (7).

5) Install packing (2) on cap (1).

6) Install spring (3) and cap (1) in insert assembly (15).

7) Tighten cap (1) to a torque range of 15-25 lb-in.

(b) For valve assemblies (398310-1001, -1003):

1) Place guide (10), spring (9) and guide (8) in position on slide (13). Make sure slot in guide (10) aligns with pin (11G).

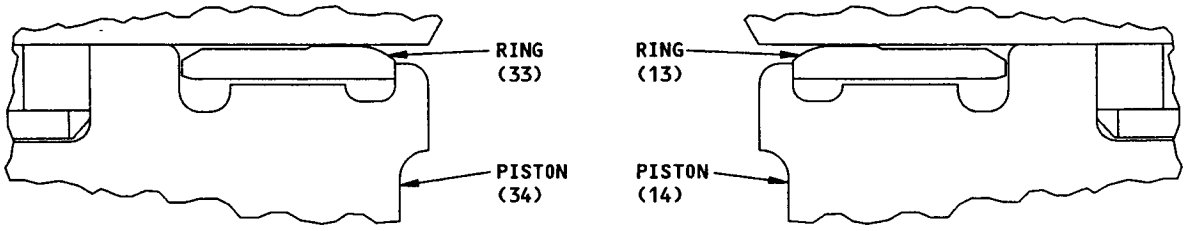
2) Move input lever (34, Fig. 1105) in the direction of an extend command until the crank (15, Fig. 1105) contacts the manifold stop. Secure this position by wedging a nylon rod between the crank and the opposite manifold stop.

3) Assemble guide (4), spring (5) and guide (6) and install in slide (13).

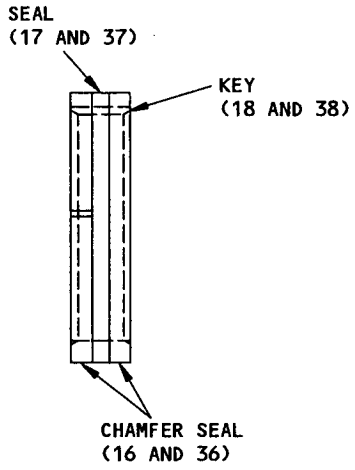
4) Use servo pin assembly tool 398310-AT4 to depress guides (4, 8) and install pin (16) through slide (13).

5) Install packing (2) on cap (1).

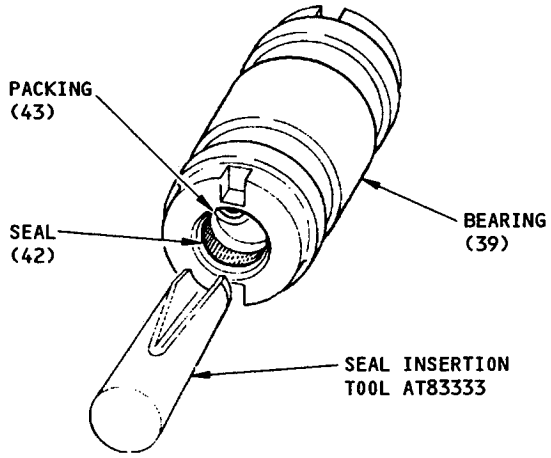
6) Install spring (3) and cap (1) in body assembly (15).



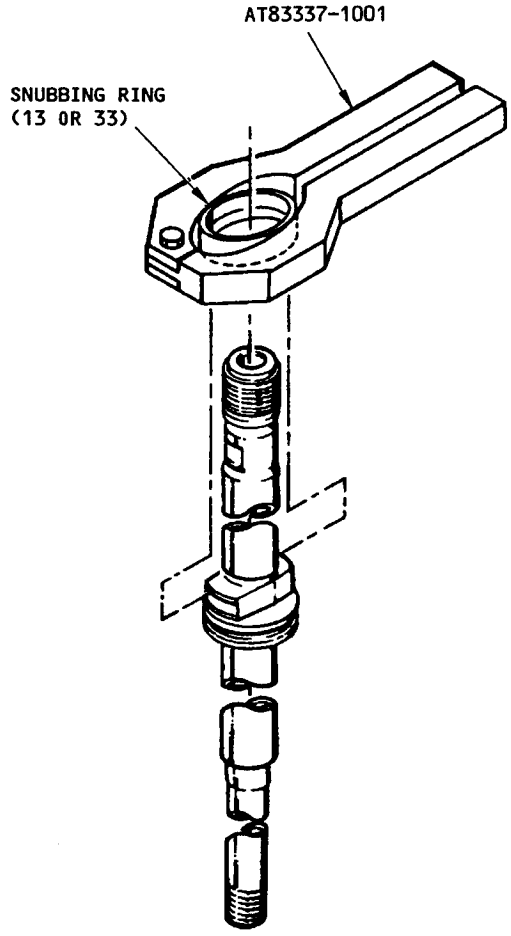
SNUBBING RING INSTALLATION



PISTON SEAL ASSEMBLY INSTALLATION



INSTALLATION OF SEALS (42) AND PACKING (43)



INSTALLATION OF SNUBBING RING

NOTE: PART INDEX NUMBERS APPLY TO FIG. 1103

Assembly of Piston Seals and Snubbing Rings
Figure 504

F57794

7) Tighten cap (1) to a torque range of from 75 to 80 pound-inches.

(27) After final testing, wipe off excess grease around caps (1, 32) and nut (39). Clean contact areas around caps and nut with solvent and apply a bead of sealant to contact areas. Allow sealant to dry and check that sealant has bonded to the surfaces.

E. Assemble Crank, Link, and Summing Lever Assemblies (72, 72A, 72B, Fig. 1101) (Fig. 1105).

(1) Install spacer (27) and bearing (26) in lever assembly (28). Do not stake bearing (26) in place.

(2) Position lever assembly (28) with link assembly (41), and install bolt (25) and washer (23). Install nut (22) and tighten to a torque range of 60-80 lb-in.

(3) Install bolt (24) and washer (21), and secure with collar (20).

(4) Install sleeve (6) and bearing (5) in lever assembly (15). Do not stake bearing (5) in place.

(5) Align lever assembly (15) with link assembly (41) and install bolt (8), and washer (4) and secure bolt (8) with nut (3).

(6) Tighten nut (3) to a torque range of 60-80 lb-in.

(7) Install bolt (7) and washer (2).

(8) Secure bolt (7) with collar (1).

(9) Install bearing (31) in lever assembly (28). Do not stake bearing in place.

F. Assemble Forward Manifold Assembly (Fig. 1104).

NOTE: This assembly procedure is covered under replacement.

G. Assemble Cylinder Assembly Buildup (13, Fig. 1101) (Fig. 1103 and 504).

(1) Apply a light coat of assembly lube to the bearing surfaces of braze assembly (24).

CAUTION: RINGS (13, 33) MUST BE INSTALLED AS SHOWN TO ENSURE PROPER SNUBBING ACTION.

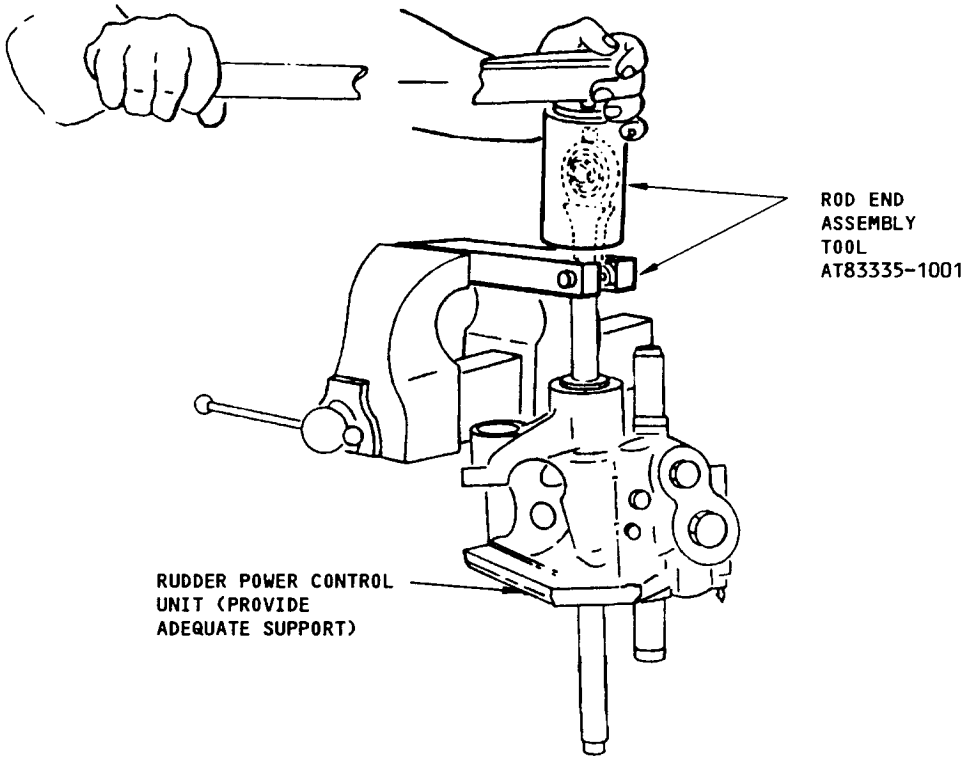
(2) Using snubbing ring clamp AT83337-1001, install rings (13, 33). After installation lap rings (13, 33) to the mating surfaces of the forward and aft pistons (14, 34) respectively.

(3) Apply a light coat of assembly lube to the internal surfaces and rod end threads of piston (34) and to faying surfaces of pistons (14, 34). Do not lubricate threads on opposite end of piston (34).

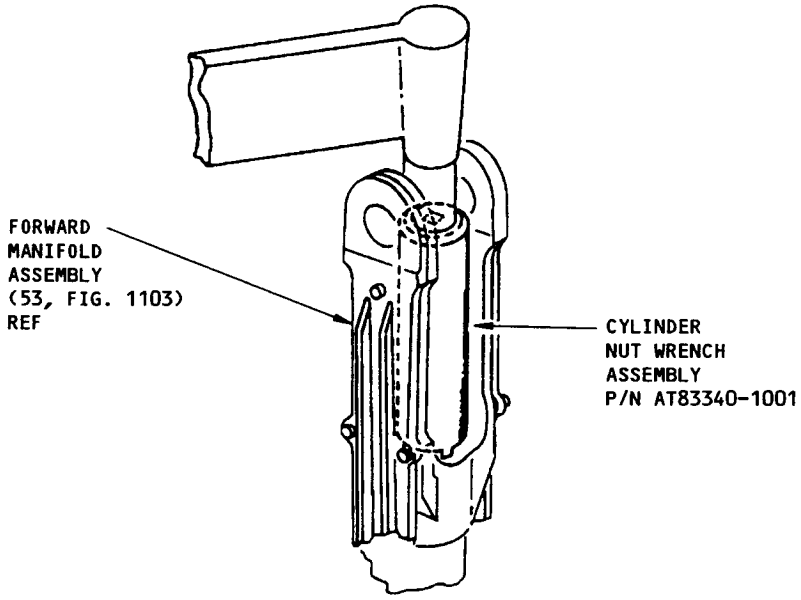
(4) Install packing (31) and rings (32) on bearing (30), and insert bearing (30) in manifold assembly (54).

(5) Install packing (29) and seal (28) in bearing (30).

(6) Install retainer (27) and scraper (26).



Installation of Rod End
Figure 505



Installation of Cylinder Nut
Figure 506

(7) Thread nut (25) to engage approximately 2 threads and apply a light coating of grease to threads of nut. Using cylinder nut wrench assembly AT83340-1001, tighten until nut contacts bearing (30), then back off nut one-quarter turn.

CAUTION: MANIFOLD BORE MAY BE REWORKED 0.015 OR 0.030-INCH OVERSIZE AND REQUIRE MATCHING OVERSIZE SEAL ASSEMBLY (35) AND PISTON (34). EXERCISE CARE TO PREVENT DAMAGE TO SEAL ASSEMBLY.

(8) Install seal assembly (35) composed of key (38) and seals (36, 37) as shown in Fig. 504.

(9) Insert piston (34) in manifold assembly (54).

(10) Using seal insertion tool AT83333, install seals (42) and packing (43) as shown in Fig. 504.

(11) Install packings (40) and rings (41).

(12) Install bearing (39) in manifold assembly (54).

(13) Tighten nut (25) to 165-185 lb-ft.

(14) Install rod end assembly (21) and using Rod End Assembly Tool 83335-1001, tighten to 165-175 lb-ft (lubricated) (Fig. 505).

(15) Install rings (12) and packing (11) on bearing (10) and install bearing in manifold assembly (53).

(16) Install packing (9) and seal (8) in bearing (10).

(17) Install retainer (7) and scraper (6).

(18) Thread nut (5) to engage approximately 2 threads and apply a light coating of grease to exposed threads of nut.

(19) Using Cylinder Nut Wrench Assembly AT83340-1001, tighten nut until it contacts bearing (10), then back off nut one-quarter turn (Fig. 506).

CAUTION: MANIFOLD BORE MAY BE REWORKED 0.015 OR 0.030-INCH OVERSIZE AND REQUIRE MATCHING OVERSIZE SEAL AND PISTON ASSEMBLY (14, 15). EXERCISE CARE TO PREVENT DAMAGE TO SEAL ASSEMBLY.

(20) Install seal assembly (15) (Fig. 504).

CAUTION: MANIFOLD BORE MAY BE REWORKED OVERSIZE. MATCHING OVERSIZE PISTON ASSEMBLY MUST BE USED.

(21) Install rings (20) and packing (19) in piston (14) and install piston in manifold assembly (53).

(22) Tighten nut (5) to 165-185 lb-ft.

(23) Install rings (52) and packings (51) on tubes (50). Install tubes.

(24) Carefully mate manifold assembly (53) with manifold assembly (54).

(25) Install washers (49), bolts (48), and tighten bolts snugly. Do not lubricate threads of bolts (48), or tighten bolts. Install screw (44) and tighten snugly.

(26) Install washer (4), nut (3), and tighten nut to 1200-1300 lb-in (no lubricant).

(27) Install washer (2), nut (1), and tighten nut snugly.

(28) Install bushings (46) and bolts (47).

(29) Install collars (45) and tighten snugly.

(30) Tighten bolts (48) to 240-260 lb-in (no lubricant), and screw (44) to 50-70 lb-in.

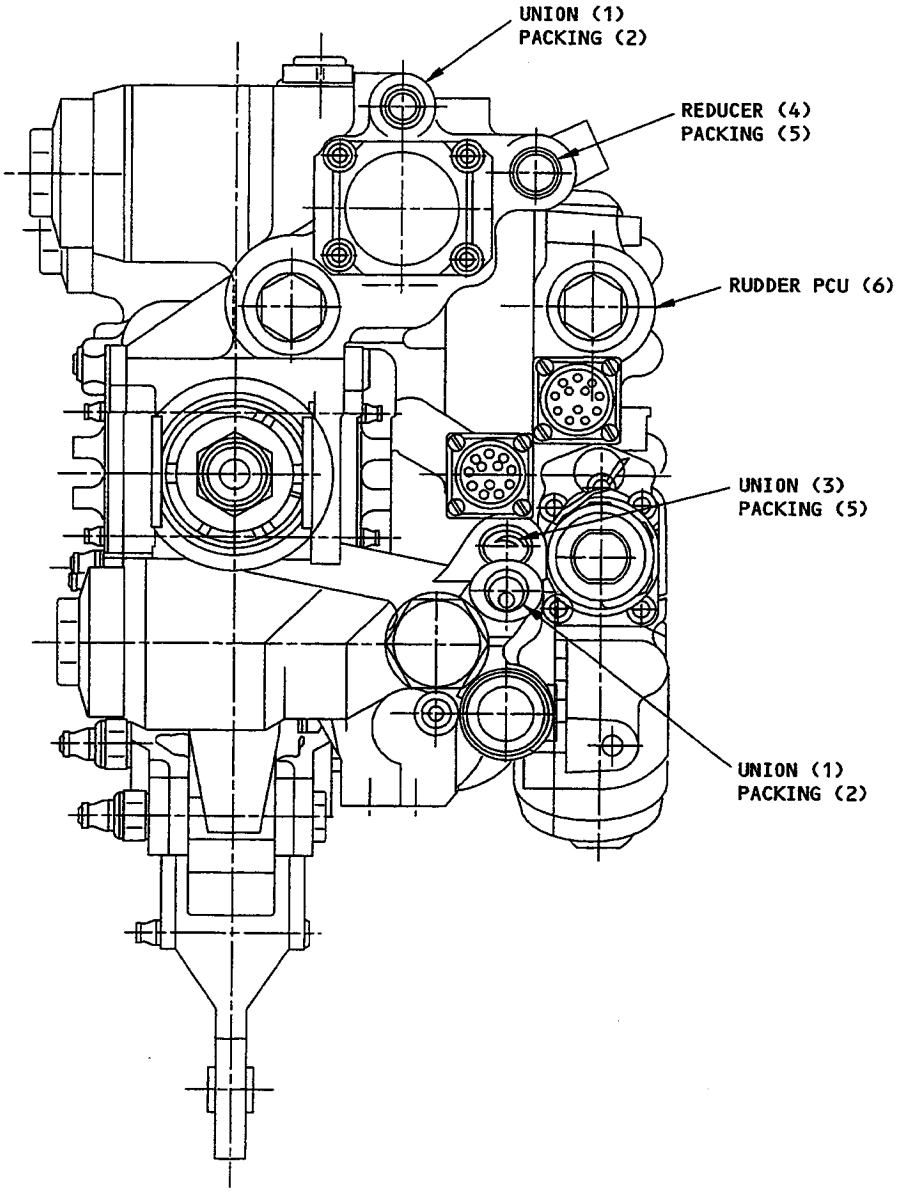
(31) Tighten nut (1) to 160-190 lb-in (no lubricant).

(32) Fully tighten collars (45).

H. Assemble Rudder Power Control and Assembly (Fig. 1111 and 507)

CAUTION: MAKE SURE THE UNIONS (1, 3) AND THE REDUCER (4) ARE INSTALLED CORRECTLY. INCORRECT INSTALLATION OF THE UNIONS OR THE REDUCER DURING ASSEMBLY OR DURING INSTALLATION OF THE PCU ON THE AIPRLANE CAN LEAD TO A CROSS CONNECTION OF THE SYSTEM A AND B HYDRAULIC SYSTEMS.

(1) Install unions (1, 3), reducer (4), and packings (2, 5) in power control unit (6) as shown in Fig. 507.



Installation of Hydraulic Fittings in Rudder PCU Assembly
Figure 507

3. Final Assembly of Power Control Unit (Fig. 1101).

NOTE: Testing is recommended before any lockwire is installed.

A. Install actuator assembly (27) with built-up parts in manifold assembly (9). (Refer to assembly paragraph 2.D.(1)).

B. Install filter elements (31).

(1) Install rings (33) and packing (32) on filter elements (31) and install filter elements (31) in manifold assemblies (53 and 54, Fig. 1103).

(2) Install rings (30) and packing (29) on cap (28). Thread cap to engage approximately 2 threads and apply a light coating of grease, Batco 8401 to exposed threads of cap.

(3) Tighten cap to 200-250 pound-inches.

C. Install filter elements (37).

(1) Install rings (39) and packing (38) on filter element (37) and install filter elements in manifold assemblies (53 and 54, Fig. 1103).

(2) Install rings (36) and packing (35) on cap (34). Thread cap to engage approximately 2 threads and apply a light coating of grease, Batco 8401 to exposed threads of cap.

(3) Tighten cap to 100-125 pound-inches.

D. Install valve assemblies (41).

(1) Install packing (42) on valve assemblies (41).

(2) Install gaskets (43) and valve assemblies (41) on manifold assembly (54, Fig. 1103) and manifold assembly (9).

(3) Install and tighten screws (40) to a torque range of 25 to 35 pound-inches.

E. Install Servo Valve (45).

(1) Install packing (46) on servo valve (45).

(2) Install gasket (47) and servo valve (45), on manifold assembly (9) and manifold assembly (54, Fig. 1103).

(3) Install and tighten screws (44) to a torque range of 25 to 35 pound-inches.

F. Install valve assemblies (51).

(1) Install rings (55) and packings (54) on sleeve (52).

(2) Install spring (56), slide (53), and sleeve (52) in manifold assemblies (53, 54, Fig. 1103).

(3) Install rings (50) and packing (49) on caps (48). Thread cap to engage approximately 2 threads and apply a light coating of grease to exposed threads of cap. Tighten cap to 100-125 lb-in.

(4) Paint torque stripe with Skydrol resistant paint color red.

G. Install valve assemblies (59) (Fig. 501).

(1) Install rings (65) and packing (64) on seat (60).

(2) Install valve assemblies (59) in manifold assembly (53, 54, Fig. 1103).

(3) Install packing (58) on cap (57). Install cap and tighten to 200-250 lb-in.

H. Install flow control plugs (68), or thermostatic valve assemblies (68).

(1) Place rings (70) and packing (69) on plugs (68), or valve assemblies (68) and install in manifold assemblies (53, 54, Fig. 1102).

(2) Place packings (67) on caps (66). Install caps and tighten to 200-250 lb-in.

I. Install manifold assembly (9) or cover assembly (9).

(1) Install rings (12) and packing (11) on connectors (10).

(2) Install connectors (10) in forward manifold assembly (53, Fig 1103).

(3) Place manifold assembly or cover assembly in position and secure using parts (1 thru 8) as applicable.

(4) Tighten screws (1, 2, 4) and nut (8) until snug, then tighten to following torque values:

(a) Screws (2) to 65-80 lb-in.

(b) Screws (4, 4A) to 45-55 lb-in.

(c) Screws (1) to 25-35 lb-in.

(d) Nut (8) to 50-70 lb-in.

J. Install crank, link and summing lever assemblies.

(1) Install spacer (30, Fig. 1106) on shaft of crank (10, Fig. 1105).

(2) Place link and summing lever assemblies (41, 28, Fig. 1105) in position and fit lever assembly (15, Fig. 1105) on the serrated ends of cranks (10, 11, Fig. 1105). Drilled holes for screws (16) must be in alignment.

NOTE: Refer to 4.F.(2), page 413, for bearing (31, Fig. 1105) installation.

(3) Install bolt (21), nut (19), and tighten nut to 45-60 lb-in.

(4) Install bolts (16), washers (15), nuts (14). Tighten nuts NAS679A4W to 90-110 lb-in and nuts MS21042L4 to 50-70 lb-in.

(5) Install bolt (20), washer (18), and collar (17).

K. After completion of final test, install lockwire in accordance with 20-50-02 and Fig. 508. Seal lockwire with No. 67 alucast seals.

L. After testing, wipe off excess grease from contact areas around caps (28, 34, 48, Fig. 1101; 1, 32, Fig. 1106) and nuts (5, 25, Fig. 1103) and clean areas with solvent. Apply a bead of sealant to contact areas and allow to cure. Check that sealant has bonded to the surfaces.

4. Materials

NOTE: Equivalent substitutes may be used.

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

B. Assembly Lube -- Skydrol MCS352 (Ref 20-60-03)

C. Hydraulic Fluid Resistant Paint -- Catalac 443-3-6

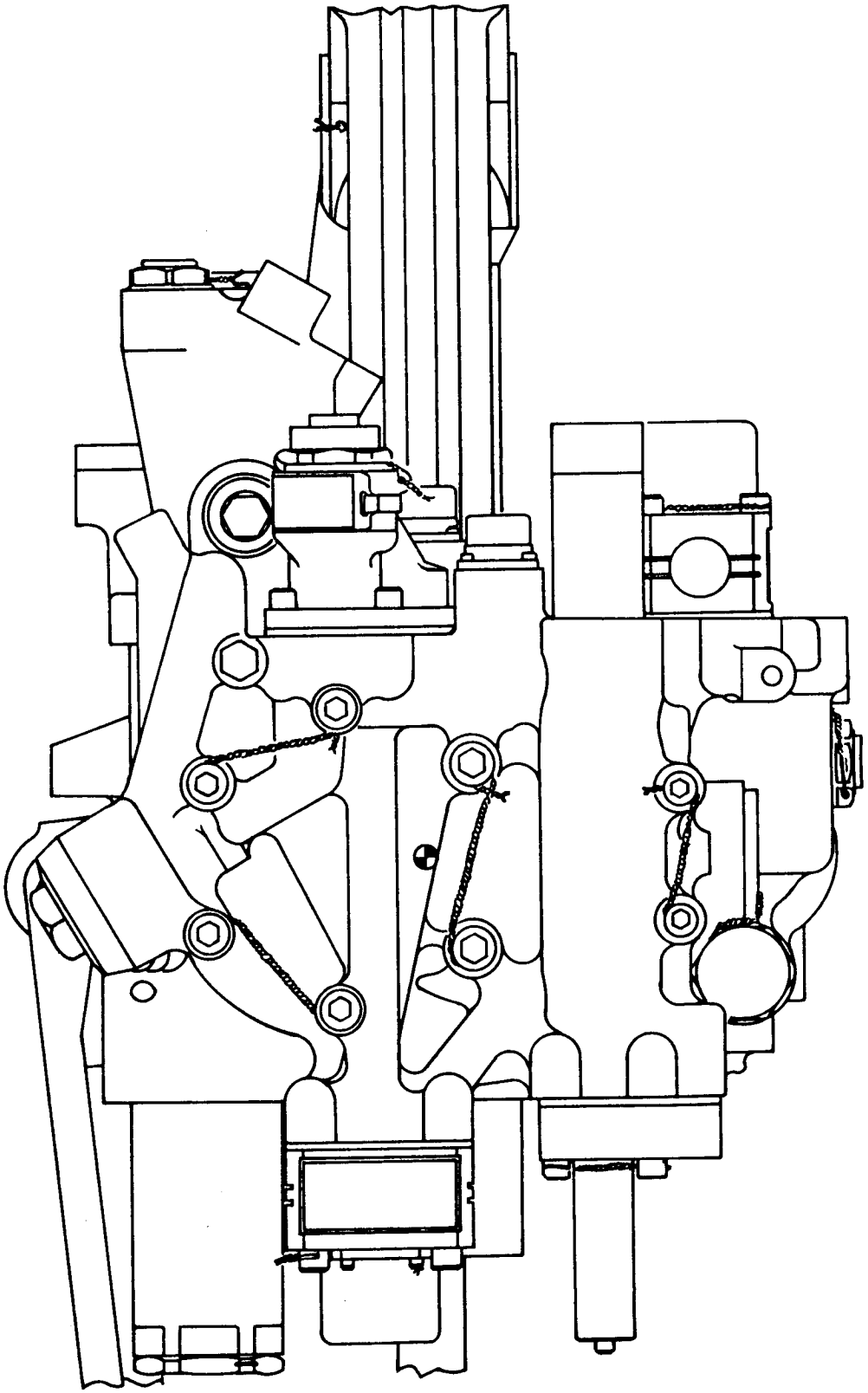
D. Grease -- Batco 8401 No. 1 (No. 2 Optional) (Ref 20-60-03)

E. Solvent -- MEK (TT-M-261) (Ref 20-60-01)

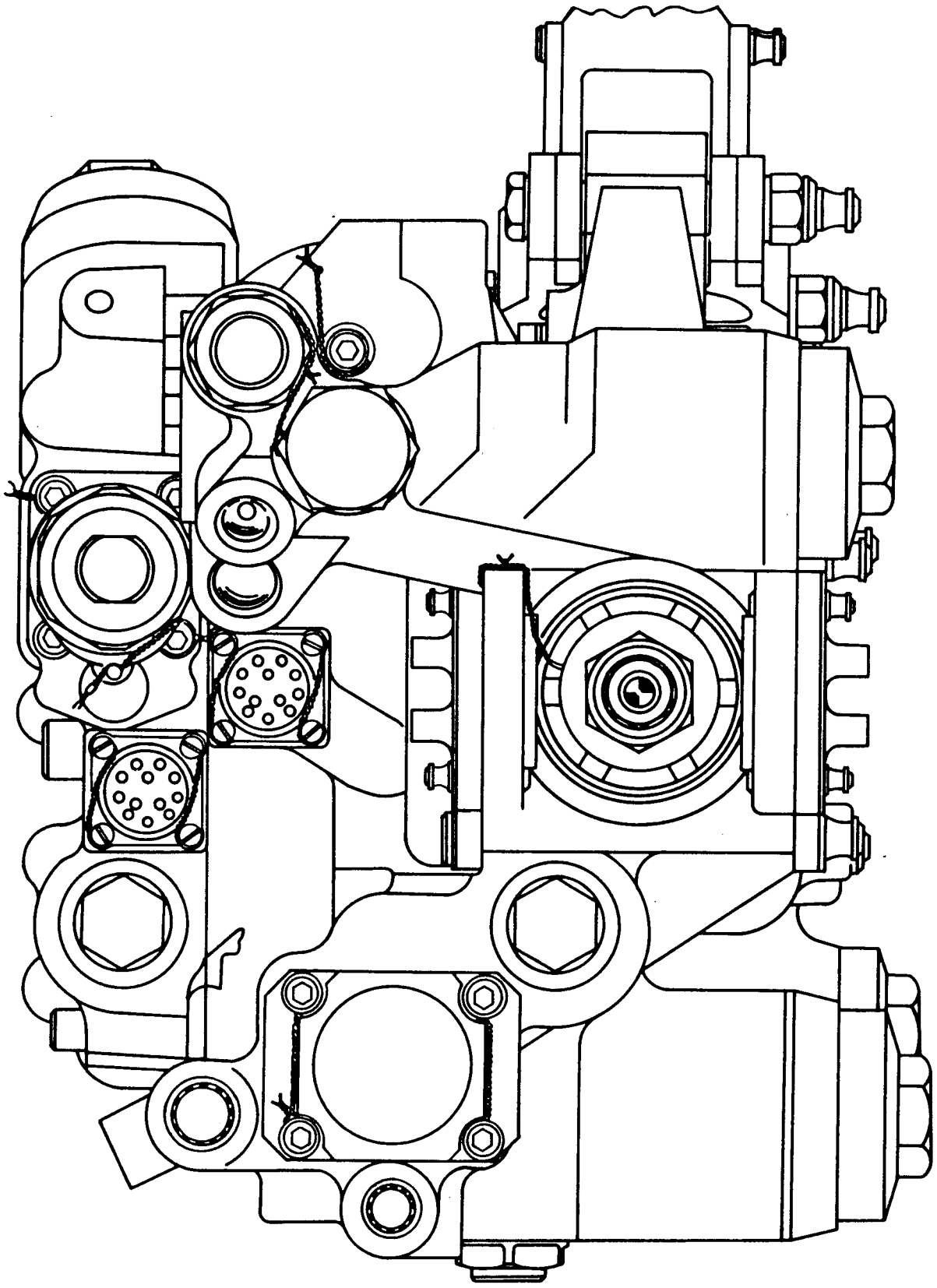
F. Sealant -- BMS 5-95, Type 1 or 2, Class B (Replaces BMS 5-26, Type 2, Class B-1/2) (Ref 20-60-04)

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

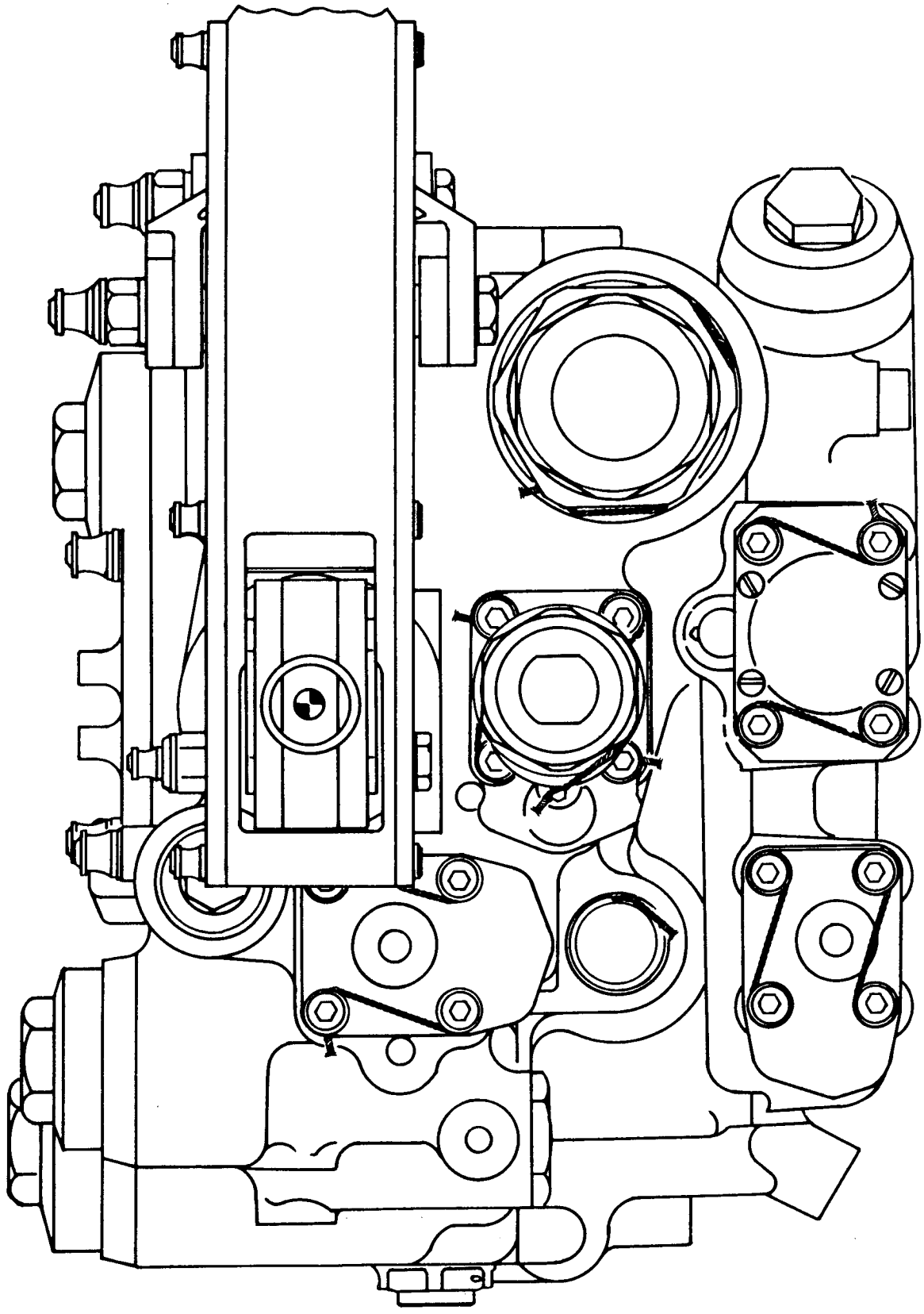
H. Alucast Seal -- No. 67, Stoffel Seals Corp., Tuckahoe, New York 10707



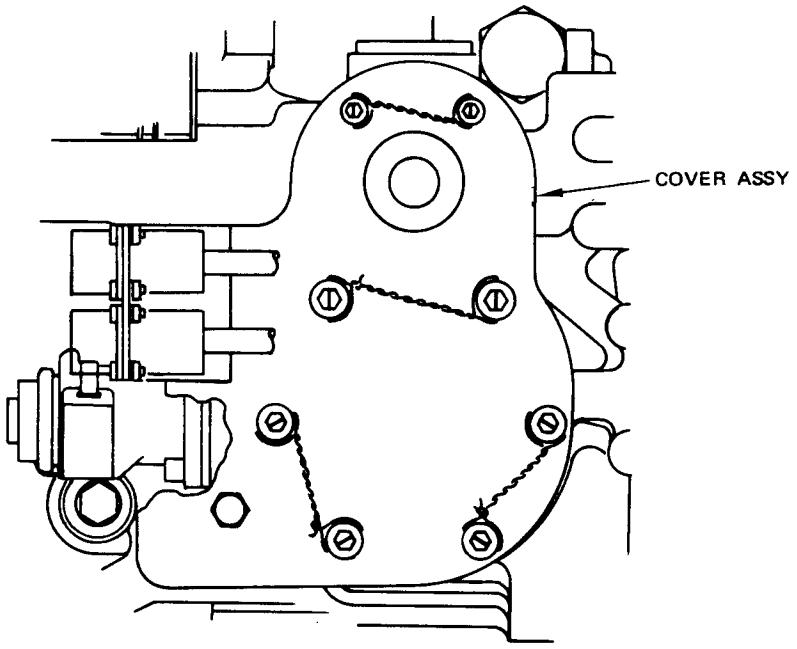
Lockwire Diagram
Figure 508 (Sheet 1)

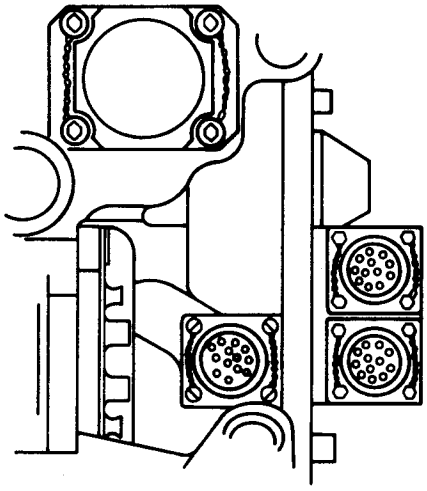


Lockwire Diagram
Figure 508 (Sheet 2)



Lockwire Diagram
Figure 508 (Sheet 3)



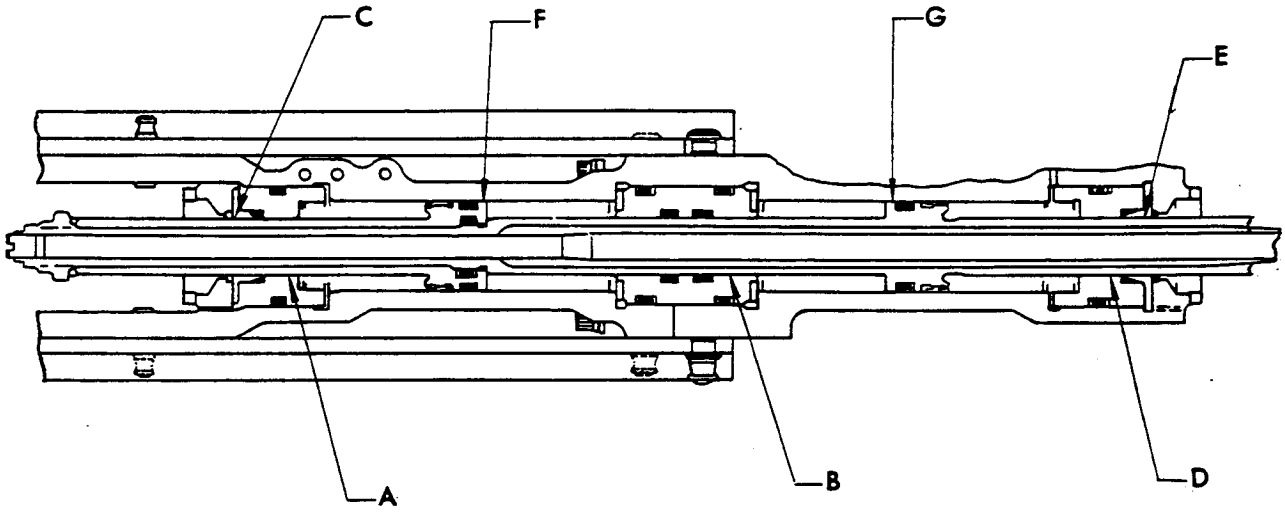


Lockwire Diagram
Figure 508 (Sheet 4)

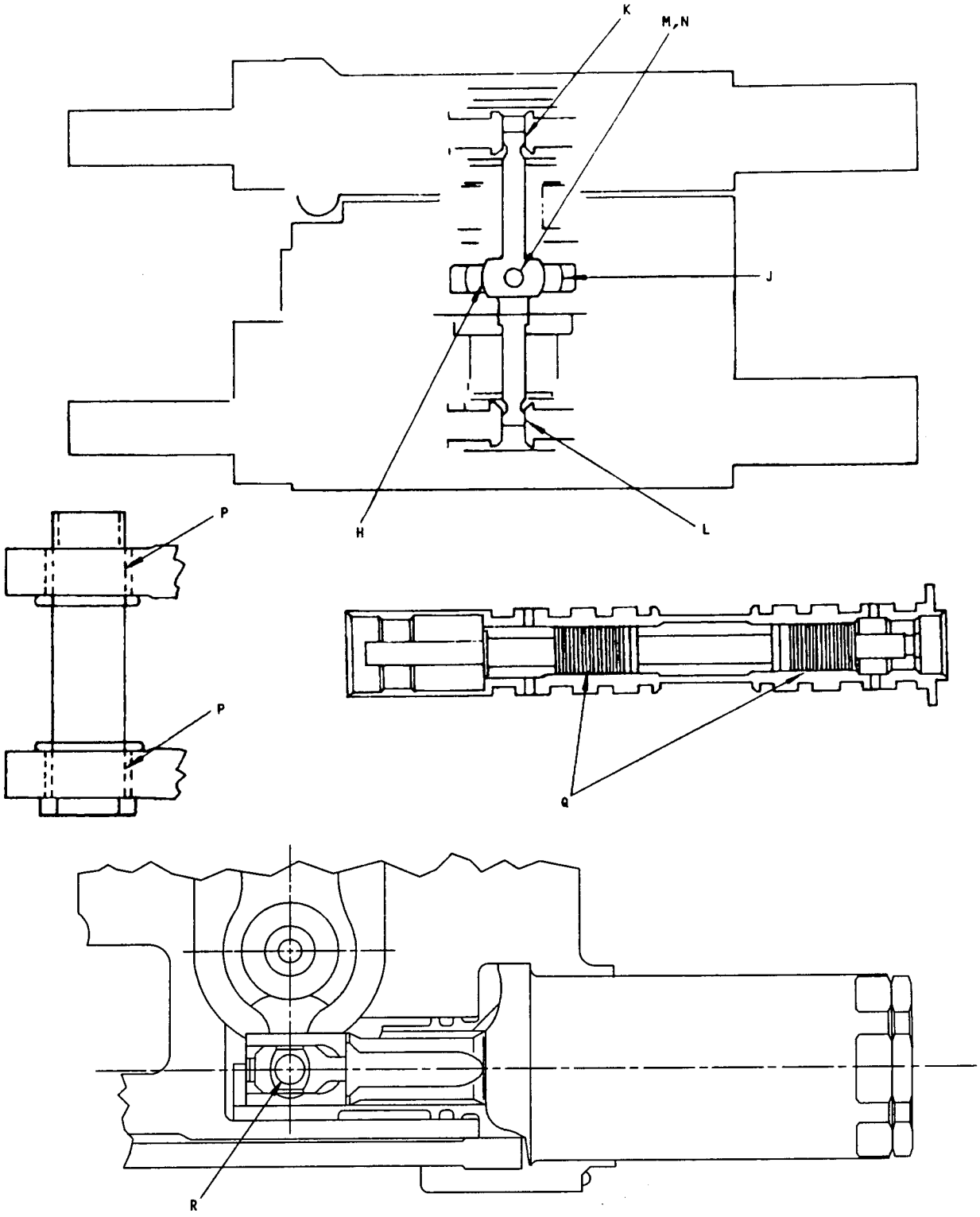
FITS AND CLEARANCES

1. Figure 601 lists original design dimensions and service wear limits for certain close tolerance parts of the assembly. The original design dimensions are to be used as a guide for rework of parts which fail to meet the wear tolerance requirements. Unless otherwise specified in the rework procedure, a part should be returned to the design dimensions whenever rework is accomplished.

2. Clearances are given to aid assembly of the component. The value given in the "Maximum Allowable Clearance" column is the maximum permitted to ensure proper functioning until the next overhaul cycle of the component. If assembled parts fail to meet these requirements, 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 whenever newly reworked parts are assembled, the design clearances should be used as the guiding assembly criteria.



Fits and Clearances
Figure 601 (Sheet 1)



Fits and Clearances
Figure 601 (Sheet 2)

H15297

Ref Letter Fig.601	Mating Item No. Fig.	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 1103-10	0.8763	0.8767	0.004	0.005		0.8783	0.006
	OD 1103-14	0.8717	0.8723			0.8703		
B	ID 1103-39	0.8764	0.8770	0.0041	0.0053		0.8823	0.010
	OD 1103-34	0.8717	0.8723			0.8664		
C	ID 1103-7	0.8770	0.8780	0.0047	0.0063		0.8823	0.010
	OD 1103-14	0.8717	0.8723			0.8670		
D	ID 1103-30	0.8763	0.8767	0.004	0.005		0.8783	0.006
	OD 1103-34	0.8717	0.8723			0.8703		
E	ID 1103-27	0.8770	0.8780	0.0047	0.0063		0.8823	0.010
	OD 1103-34	0.8717	0.8723			0.8670		
F	ID 1104-11	1.4290	1.4294	0.005	0.006		1.434	0.010
	OD 1103-14	1.4234	1.4240			1.419		
F *[4]	ID 1104-11	1.4440	1.4444	0.005	0.006		1.449	0.010
	OD 1103-14	1.4384	1.4390			1.434		
F *[5]	ID 1104-11	1.4590	1.4594	0.005	0.006		1.464	0.010
	OD 1103-14	1.4534	1.4540			1.449		
G	ID 1109-23	1.4290	1.4294	0.005	0.006		1.434	0.010
	OD 1103-34	1.4234	1.4240			1.419		
G *[4]	ID 1109-23	1.4440	1.4444	0.005	0.006		1.449	0.010
	OD 1103-34	1.4384	1.4390			1.434		
G *[5]	ID 1109-23	1.4590	1.4594	0.005	0.006		1.464	0.010
	OD 1103-34	1.4534	1.4540			1.449		

Ref Letter Fig. 601	Mating Item No. Fig.	Design Dimensions				Service Wear Limits		
		Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inches)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
H	ID 1106-20	0.8750	0.8751	0.0000	0.0002		0.8753	0.0006
	OD 1106-9	0.8749	0.8750			0.8747		
J	ID 1106-26	1.3001	1.3002	0.0000	0.0002		1.3004	0.0009
	OD 1106-20	1.3000	1.3001			1.2995		
K	ID 1110-18	0.3124	0.3125	0.0001	0.0003		0.3127	0.0010
	OD 1106-9	0.3122	0.3123			0.3117		
K	ID 1101-9B	0.3124	0.3125	0.0001	0.0003		0.3125	0.0008
	OD 1106-9	0.3122	0.3123			0.3117		
L	ID 1110-18	0.3124	0.3125	0.0001	0.0003		0.3127	0.0010
	OD 1106-10	0.3122	0.3123			0.3117		
M	ID 1106-9	0.2502	0.2504	0.0001	0.0005		0.2504	0.0005
	OD 1106-8	0.2499	0.2501			0.2499		
N	ID 1106-10	0.2502	0.2504	0.0001	0.0005		0.2504	0.0005
	OD 1106-8	0.2499	0.2501			0.2499		
P	ID 1104-3	0.9995	1.0000	0.0005	0.0020		1.0030	0.0040
	OD *[1]	0.9980	0.9990			0.9955		
Q	ID 1110-19	*[2]				*[3]		
	OD 1110-18							
R	ID 1108-14	0.3125	0.3127	0.0000	0.0003		0.3129	0.0015
	OD 1106-20	0.3124	0.3125			0.3114		

*[1] Part number 69-37282-1 reference.
*[2] Lap fit in accordance with functional requirements.
*[3] When functionally tested in accordance with TESTING, par. 4.A.(10) to par. 4.A.(12), leakage limits shall be as follows:
1. 36 instead of 24 cc per minute
2. 24 instead of 16 cc per minute
3. 7 ½ instead of 5 cc per minute
*[4] Unit with 0.015-inch oversize piston and bore.
*[5] Unit with 0.030-inch oversize piston and bore.

Fits and Clearances
Figure 601 (Sheet 4)

TESTING

1. Test Conditions

   A. Use a hydraulic test stand to provide fluid flow up to 6 gpm at 3000 psi and 0.5 gpm at 5400 psi.

   B. Use hydraulic fluid conforming to BMS 3-11 or Skydrol 7000, at temperature of 70 to 120°F, filtered to 10 microns nominal, for testing.

   C. Use the following electrical power sources for equipment actuation when specified:

      (1) Solenoid valve operating voltage, 18-32 volts dc.

      (2) Linear position transducer excitation voltage, 26 volts, 400 hz ac.

      (3) Electrohydraulic servo valve control voltage 0.0 ±8 volts dc.

   D. Use special tools and test equipment as specified in Special Tools, Fixtures and Equipment, or equivalent.

   E. Refer to Trouble Shooting section for information if components, subassemblies, or final assembly fail to function as required during testing.

2. Perform listed pretests on the following assemblies and components, prior to installation.

   A. Pretesting for components of Power Control Unit Assembly (Fig. 1101).

      (1) Auxiliary manifold assembly (9) or cover assembly (9) -- Pretest may be performed in accordance with par. 11. See Fig. 403 or 403A for wiring diagram.

      (2) Cylinder assembly (13) -- Pretest in accordance with par. 3.

      (3) Yaw damper actuator assembly (27) -- Pretest in accordance with par. 4.

      (4) Hydraulic solenoid valve assembly (41) -- Pretest in accordance with par. 5.

      (5) Electrohydraulic servo valve (45) -- Refer to manufacturer's overhaul manual for details of functional testing. Use gasket plate (47, Fig. 1101) or equivalent to mount valve on suitable test fixture.

(6) Bypass Valve Assembly (51) -- Pretest in accordance with par. 6.

(7) Check Valve Assembly (59) -- Pretest in accordance with par. 7.

(8) Thermostat Valve Assembly (68) -- Pretest in accordance with par. 8.

(9) Filter Elements (31 and 37) -- Pretest in accordance with Inspection/Check.

B. Pretesting for components of Cylinder Assembly Buildup (13, Fig. 1101). (See Fig. 1103.)

(1) Aft Manifold Assembly (54) -- Pretest may be performed in accordance with par. 11. (See Fig. 403 for wiring diagram.)

C. Pretesting for components of Manifold Buildup (73, Fig. 1101). (See Fig. 1106.)

(1) Walking Beam Assembly (3) -- Pretest in accordance with par. 9.

(2) Dual Servo Valve Assembly (40) -- Pretest in accordance with par. 10.

D. Functional testing of completed Rudder Power Control Unit Assembly -- Test in accordance with steps 11 and 12.

3. Rudder PCU Cylinder Assembly Test

NOTE: Perform tests in steps 3.E., 3.F., 3.G., 3.H., 3.I., in order. Other tests may be done in any convenient sequence.

A. Test Equipment (Fig. 701)

NOTE: Part references given below refer to test fixture part identification.

(1) Provide a Cylinder Test Fixture Assembly -- TF83364-1001, or equivalent

(2) Orifices -- TF83364-159, or equivalent (Part of item (1)) (2 required)

(3) Switch Box -- SF60600, or equivalent

(4) Oscilloscope -- Hewlett-Packard Model 130, or equivalent

(5) Check valves, to crack at 100 psi (2 required)

(6) Four-way valve (Part of Item (1).

(7) Plugs, 59110, 59149, 60754-3. One nut, 68053, two each of following caps, 59119, 59120 (All furnished with item (1)) (2 of each required).

(8) Plugs -- 69-35614, 69-35625 (Furnished with item (1)).

(9) Velocity transducer -- 7LV-4 or equivalent (Part of item (1)).

(10) Linear transducer -- 35-109 or equivalent (Part of item (1)).

(11) Probe -- TF 68040-113 or equivalent (Part of item (1)).

B. Before checking cylinder assembly, attach following parts to cylinder assembly:

	NOMENCLATURE	FIG. AND ITEM NO.		QUANTITY
65-44868-1 *[1]	MANIFOLD ASSY, AUX	1102		1
69-54772-1 *[2]	COVER ASSY	1102A		1
69-54772-24 *[3]	COVER ASSY	1102A		1
69-35618-1	CAP, INPUT CRANK ACCESS	1106	13	1
NAS1611-233	PACKING, O-RING	1106	14	1
S12766-233	RING, BACKUP	1106	15	2
NAS1611-223	PACKING, O-RING	1106	12	1
68002	CONNECTOR, HYDRAULIC	1101	10	2
NAS1611-010	PACKING, O-RING	1101	11	4
S12766-010	RING, BACKUP	1101	12	8
NAS1611-118	PACKING, O-RING	1106	41	1
66-22752-1	TUBE, CONNECTOR	1103	50	4
NAS1611-009	PACKING, O-RING	1103	51	8
S12766-009	RING, BACKUP	1103	52	1
NAS1611-011	PACKING, O-RING	1106	42	4

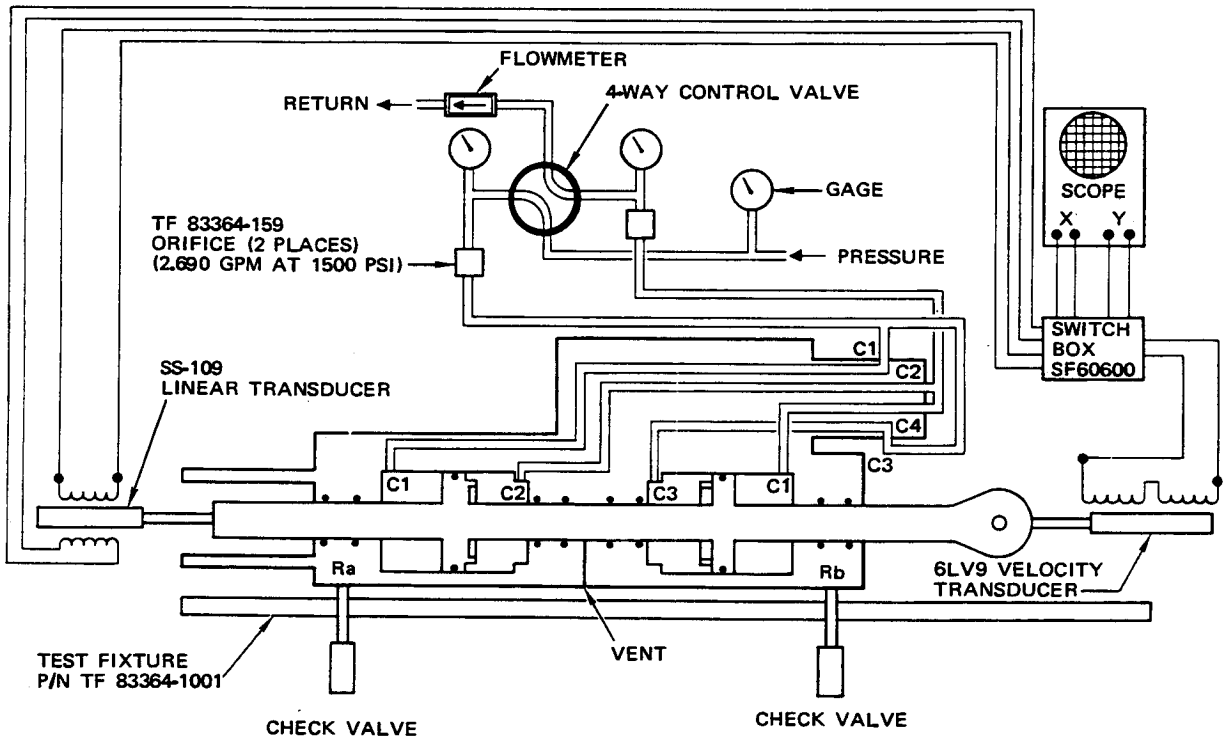
*[1] USED ON 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10 AND 65C37053-2, -3, -4, -10

*[2] USED ON 65-44861-5, -6, 65C37052-5, -6 AND 65C37053-5, -6

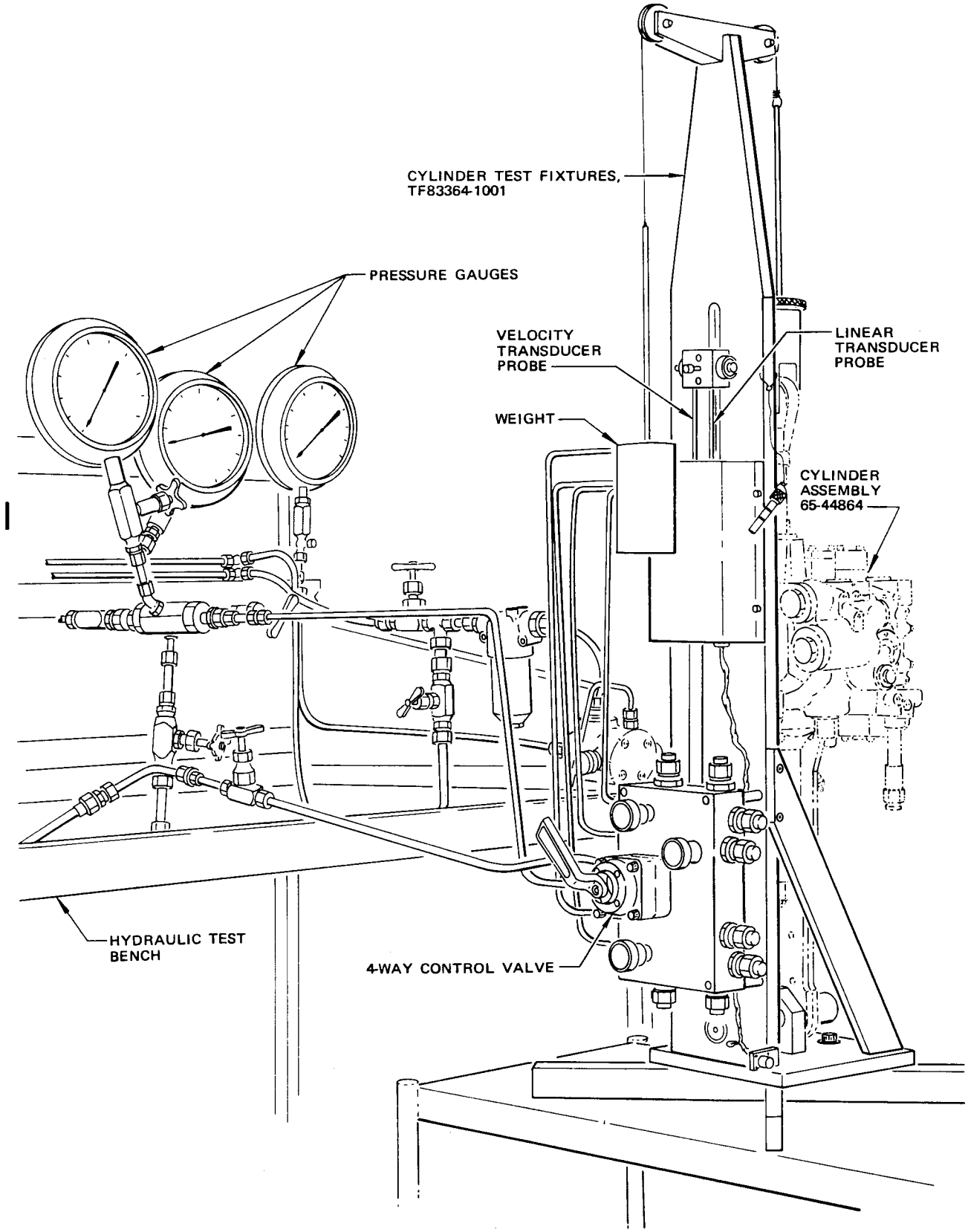
*[3] USED ON 65-44861-7, -8, -9, -11, -12, 65C37052-7, -8, -9, AND 65C37053-7, -8, -9

(1) Install cylinder assembly and associated parts onto test fixture, TF83364-1001. (See figure 702.)

(2) Arrange check valves, wiring and plumbing as shown in figure 701.



Snubber Test in Cylinder Fixture Assembly
Figure 701



Cylinder Assembly Installed in Test Fixture
Figure 702

C. Proof Pressure Check

(1) With ports Ra and Rb open, apply 200-psi hydraulic pressure to four-way valve and cycle actuator 50 full strokes to seat channel seals.

(2) With all other ports open, simultaneously apply 4500-psi fluid pressure to ports C1, C3, Pa and Pb and hold for 3 minutes.

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

(4) With all other ports open, simultaneously apply 4500-psi fluid pressure to ports C2, C4, Pa and Pb and hold for 3 minutes.

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

(6) No external leakage is permitted.

(7) Plug ports Ra and Rb. Apply 2000-psi pressure at ports C1 and C3 and ports C2 and C4 for 1 minute minimum.

CAUTION: DO NOT MOVE OR CYCLE THE ACTUATOR WHILE PORTS Ra AND Rb ARE PLUGGED, BEFORE REDUCING PRESSURE AT C1, C3 AND C2, C4.

(8) Apply 3- to 7-psi pressure to C1, C3 and C2, C4 and hold for 1 minute minimum.

(9) No external leakage or permanent set is permitted.

D. Snubbing Test (Not required for units in service)

(1) With cylinder installed in test fixture, P/N TF83364-1001, connect rod end to velocity transducer and complete electrical connections. (See figure 701.) Install 100-psi check valves at return ports Ra and Rb.

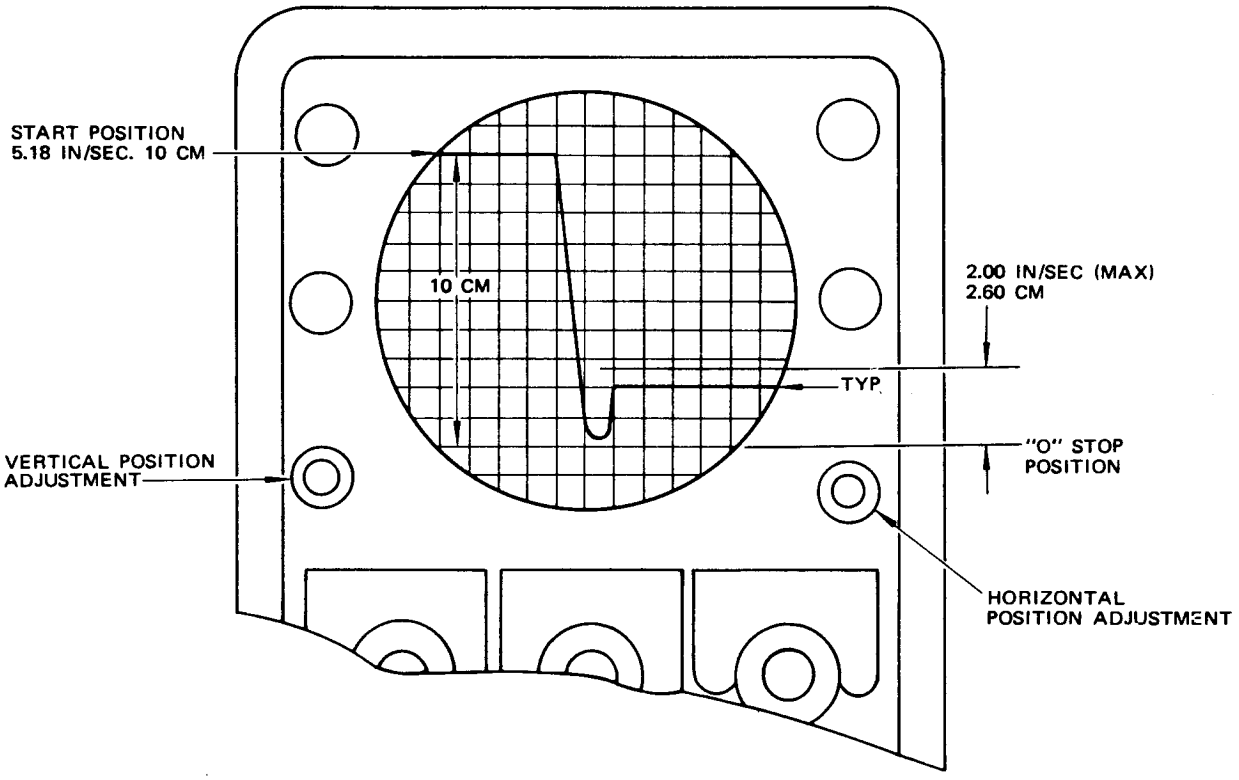
(2) Apply 3000-psi pressure to four-way valve inlet and actuate test unit.

(3) With actuator bottomed at one end, rotate oscilloscope horizontal position control knob to extreme left. Adjust X-axis sensitivity until oscilloscope beam is in "stop position" as shown on figure 703.

(4) Adjust Y-axis until beam is vertically displaced 10 centimeters to a "start position," as shown on figure 703.

(5) Operate actuator with 3000 psi after all adjustments are made. Cycle cylinder full stroke in each direction at piston rod velocity of 5.18 inches per second. Velocity must decrease in snubbing area to 2.00 inches per second maximum. Check that velocity decrease trace is within vertical limits shown in figure 703.

(6) Reverse polarity of the oscilloscope "X" and "Y" inputs by use of SF60600 switch box. Repeat steps D.(2) through D.(5) with actuator bottomed at opposite end.



Oscilloscope Data for Snubbing Check
Figure 703

E. Operating Leakage Check at Rod Glands

(1) Disconnect test fixture transducer from rod end and break electrical connections.

(2) Using four-way valve, apply 3000-psi cycling pressure and actuate cylinder through 100 full strokes.

(3) Measure leakage from each rod end and the center gland on actuator. Leakage at each rod end must not exceed 4 drops per 100 cycles, and 8 drops per 100 cycles at the center gland. No other external leakage is permitted.

F. Extend and Retract Stroke Length Measurement

(1) Open ports C2, C4, Ra and Rb. Apply 3000-psi pressure to ports C1 and C3.

(2) Actuate cylinder rod to a full stroke in extended direction. Check extended length from actuator mounting bolt centerline to centerline of rod end.

(3) Open ports C1, C3, Ra and Rb. Apply 3000-psi pressure to ports C2 and C4.

(4) Actuate cylinder rod to a full stroke in retracted direction. Check retracted length from actuator mounting bolt centerline to centerline of rod end.

(5) In the extended direction, rig pin must indicate a stroke within limits of 29.432 to 29.512 inches. In the retracted direction, rig pin must indicate a stroke within limits of 25.488 to 25.568 inches. Unit is within tolerance when rig pin fits through tolerance slots in the stroke gage bar of fixture TF83364-1001. Make sure that piston is bottomed before inserting rig pin.

G. Internal Leakage Check

(1) With all other ports open, apply 3000-psi hydraulic pressure to ports C1 and C3. Wait 1 minute, then measure individual leakage at ports C2 and C4. Leakage must not exceed 40 cc per minute at each port, after leakage stabilizes.

(2) Repeat step G.(1) except apply 100-psi pressure at ports C1 and C3. Maximum leakage permitted at either C2 or C4 is 40 cc per minute.

(3) Repeat steps G.(1) and (2), except apply pressure at ports C2 and C4 and measure individual leakage at ports C1 and C3. The same leakage requirements must be met.

H. High Pressure Friction Test

(1) Open ports Ra and Rb.

(2) Apply 3000-psi hydraulic pressure from separately controllable sources, to ports C1, C3 and C2, C4 simultaneously.

(3) Increase pressure applied to ports C1, C3 to maximum of 3075 psi, while maintaining 3000 psi at ports C2, C4. Record pressure differential required to move cylinder rod a full stroke in extended direction.

(4) Repeat previous step H.(3), except maintain 3000-psi pressure at ports C1, C3 and increase pressure to maximum of 3075 psi at ports C2, C4. Record pressure differential required to move cylinder rod a full stroke in retracted direction.

I. Low-Pressure Friction Test

(1) Open ports Ra and Rb. Place cylinder rod in the full extended position by applying pressure to ports C1 and C3. Position counterweight TF83364-155 over pulley arrangement.

NOTE: Counterweight TF83364-155 balances the weight of the piston rod, rod end, and other parts which make up the piston rod assembly for these tests.

(2) Apply 100-psi pressure simultaneously to ports C1, C2, C3, and C4. Maintain this pressure throughout this test.

(3) Apply TF83364-135 weights to cylinder rod end to push piston to retract position.

(4) Repeat previous step I.(3) except apply weights to top of TF83364-155 counterweight to extend piston through its full stroke.

(5) Loads required to move piston in either direction must not exceed 75 pounds within last 0.250 inch of stroke in each direction (snubbing region), or 50 pounds throughout middle of stroke.

4. Yaw Damper Actuator Assembly - Component Pretest (See figure 1110.)

A. Leakage Test on Lap Assembly (17)

CAUTION: LEAKAGE LIMITS (FOR THIS TEST ONLY) ARE FOR TESTING WITH SKYDROL 7000. IF HYDRAULIC FLUID CONFORMING TO BMS 3-11 IS USED, LIMITS ARE 125% OF STATED LIMITS.

(1) Install retainer (9), spring TF83309-3, retainer (7) and pin (6) on piston (18).

(2) Wet surfaces of piston (18) with fluid used for test and insert piston (18) in sleeve (19).

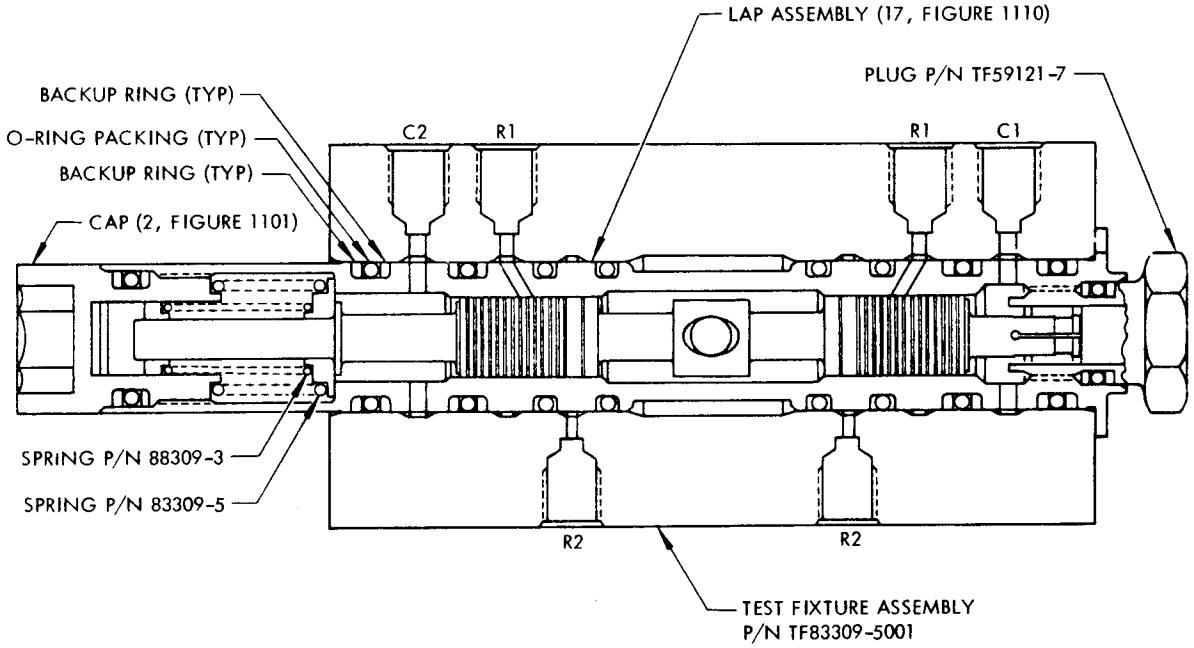
(3) Install packings (3) and rings (4) on cap (2), and packing (11) and rings (12) on plug TF59121-7.

(4) Install spring TF83309-5, cap (2) and plug, TF59121-7.

(5) Install packings (25) and rings (26).

(6) Wet surface of sleeve (19) with fluid used for test and install in Piston Lap Assembly Test Fixture, TF83309-5001 or equivalent, as shown in figure 704.

(7) Secure sleeve (19) with screws (22, figure 1101).



Lap Assembly Test Fixture
Figure 704

(8) Connect separately controlled hydraulic fluid pressure to ports C1 and C2.

(9) Interconnect the two ports with a needle valve and close valve.

(10) Apply 1000 psi hydraulic pressure to each port C1 and C2 in turn. After 1 minute wait, measure leakage. Flow from open ports must not exceed 24 cubic centimeters per minute.

(11) Apply 1000 psi hydraulic pressure simultaneously to ports C1 and C2. After 1 minute wait, measure leakage. Flow from open ports R1 and R2 must not exceed 16 cubic centimeters per minute.

(12) Apply 3000 psi hydraulic pressure to ports C1 and C2 and 100 psi to port R1. Leakage from ports R2 must not exceed five cubic centimeters per minute.

(13) Center piston (18) at dimension shown in Fig. 705.

(14) Apply 3000 psi hydraulic pressure to both ports C1 and C2.

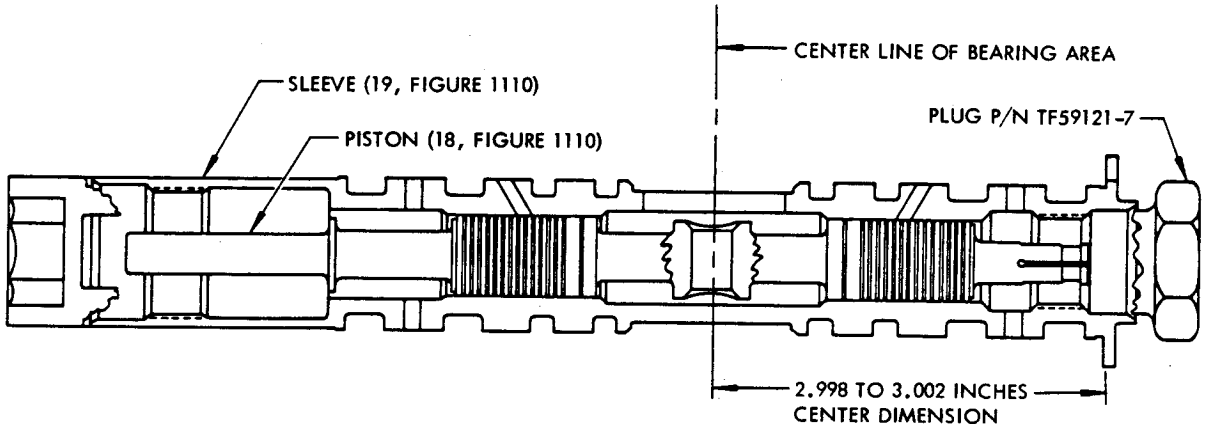
(15) Increase pressure on C1 to 3100 psi and measure stroke. Stroke shall be measured from center dimension shown in Fig. 705. Stroke length shall be as follows:

Actuator	Stroke Length (inch)
69-35609-1	0.285 - 0.315
69-35609-3	0.135 - 0.165
69-35609-5,-6	0.210 - 0.240

(16) Equalize pressure to 3000 psi on both ports C1 and C2 and measure force required to return piston (18) to neutral. Force required shall not exceed 1.5 pounds measured at centerline of piston (18).

NOTE: Test fixture springs supply the return force of 1.5 pounds.

(17) Increase pressure on port C2 to 3100 psi and again measure stroke. Stroke shall be 0.285 to 0.315 inch from center dimension.



Testing Details for Actuator Assembly
Figure 705

(18) Equalize pressure to 3000 psi on both ports C1 and C2 and measure force required to return piston (18) to neutral. Force required shall not exceed 1.5 pounds measured at centerline of piston (18).

NOTE: Test fixture springs provide return force of 1.5 pounds.

(19) Remove plug, TF59121-7, spring TF83309-3 and spring TF83309-5 after testing is completed.

B. Transducer Assembly (1, figure 1110) Test

(1) Using a standard ohmmeter check continuity between pins A and B and between pins C and D of connector.

(2) Gradually apply 1000 volts, 60 Hz ac between case and pins A and D for 5 seconds. There must be no arcing, insulation failure, or breakdown. Disregard leakage light on hypot.

(3) Using suitable megger, apply 500 volts dc between each pin and body. Resistance at each connection must be 100 or more megohms.

(4) Install transformer assembly (1) and probe (13) in transducer test fixture assembly, TF59196-1001 or equivalent: (See figure 706.)

(a) Set probe (13) to dimension shown in figure 706.

NOTE: Use gage TF59596-105, or equivalent.

(b) Set micrometer to 0.500 inch and tighten setscrew.

(c) Connect test fixture to test equipment shown on Test Setup, figure 707.

(d) Apply power to test equipment, and allow 30 minutes warmup time before continuing with test procedure.

(e) Set ratio transformer at 50000.

(f) Adjust excitation frequency to from 380 to 420 Hz.

(g) Adjust excitation voltage to from 25 to 27 volts ac.

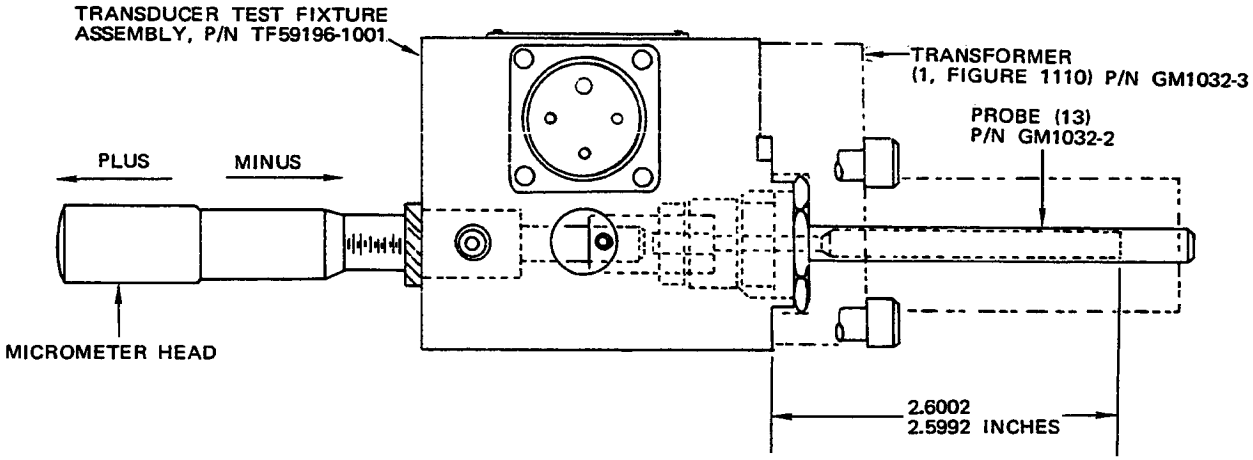
(5) Check null position and null voltage.

(a) Adjust micrometer head to obtain best null (minimum) voltage position of probe (13). Micrometer must read from 0.490 to 0.510 at best null.

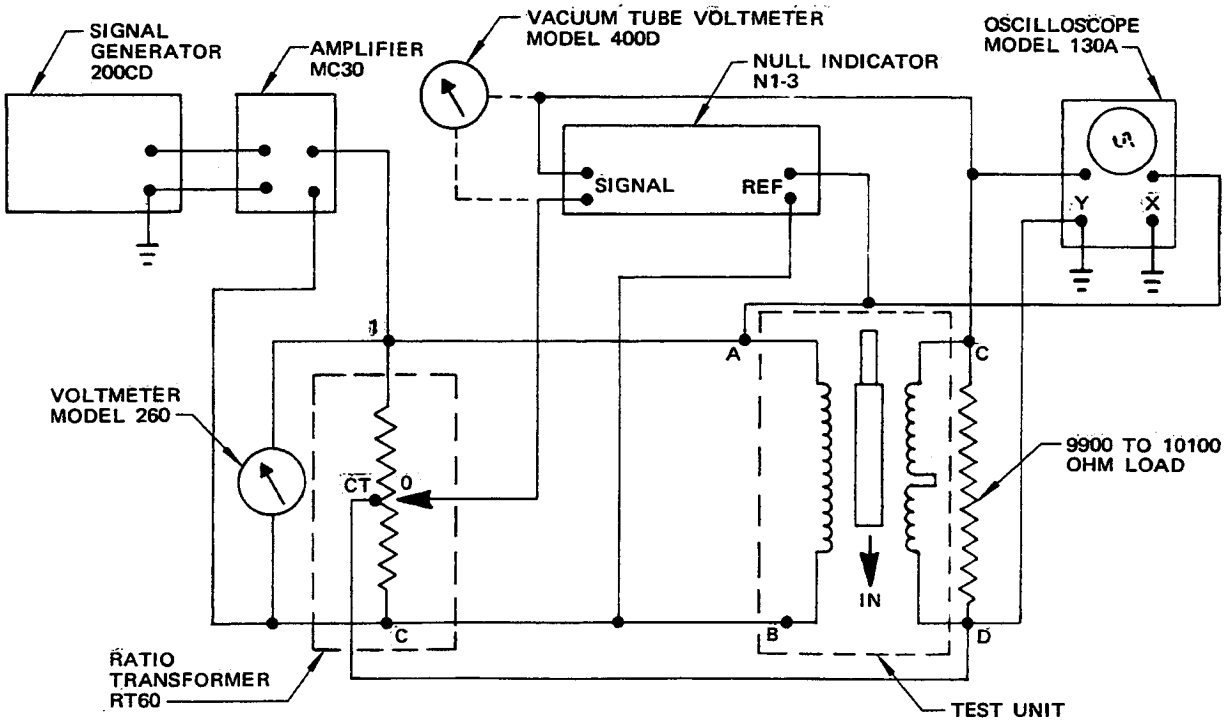
(b) At null position connect VTVM Model 400D or equivalent across SIGNAL terminals of null indicator. VTVM indication must indicate 30 millivolts or less.

(6) Check phase shift.

(a) Adjust micrometer head and set probe (13) position to plus 0.300 inch from null.



Transducer Test Fixture
Figure 706



Test Setup for Transducer Assembly
Figure 707

(b) Adjust oscilloscope Y vernier for 10 centimeters of vertical deflection.

(c) Using oscilloscope centering control, center pattern. Vertical space between traces must not exceed 1.74 centimeters.

(d) Set probe (13) at minus 0.300 inch from null and repeat procedure in (b) and (c).

(7) Check polarity.

(a) With probe (13) on minus 0.300 inch from null, check phase of input and output voltages. Voltages must be in same phase (oscilloscope pattern must be up and to the right.)

(8) Check output voltage versus displacement of probe (13).

(a) Connect VTVM Model 400D across SIGNAL terminals of null indicator.

(b) Vary displacement of probe (13) from null to approximately 0.400 inch in both directions and observe VTVM indications. Voltage output must increase as displacement of probe increases.

(9) Perform voltage gain test.

(a) Set master probe to positions listed in table shown.

(b) Adjust ratio transformer to give best null indication on each master probe position.

(c) Record ratio transformer setting. Settings must be within limits given in Test Data for Transducer Assembly, Fig. 708, and any two adjacent readings must differ between 0.0346 and 0.0520.

NOTE: Alternate methods of checking voltage gain and output vs. displacement are permissible. One method is to develop an X-Y recorder plot of gain versus probe displacement. This involves a different test fixture than shown in Fig. 706, and eliminates the need of a ratio transformer and null indicator.

(10) Deleted.

PROBE POSITION (from null)	RATIO TRANSFORMER SETTINGS	
	MINIMUM	MAXIMUM
-0.300 inch	0.6644	0.6817
-0.225 inch	0.6233	0.6363
-0.150 inch	0.5822	0.5908
-0.075 inch	0.5411	0.5455
at null	0.5000	0.5000
+0.075 inch	0.4589	0.4545
+0.150 inch	0.4178	0.4092
+0.225 inch	0.3767	0.3637
+0.300 inch	0.3356	0.3182

Test Data for Transducer Assembly
Figure 708

5. Deleted

6. Bypass Valve Assembly Pretest (Fig. 1101)

A. Test Equipment

(1) Test Fixture: TF68061-1001 (Fig. 709)

(2) Suitable supply of fluid pressure

(3) Suitable pressure gages, valves and flowmeters

B. Friction and Flow Tests (Fig. 1101).

(1) Install bypass valve (51) in test fixture TF68061-1001 (Fig. 709).

(2) Install a suitable plug in pressure outlet port.

(3) Connect port C2 to flowmeter.

(4) With R (return port) open, apply pressure simultaneously to P-IN (pressure inlet) and port C1.

(5) Raise pressure to 250 psi and measure flow from C2. Flow from C2 shall be 1.08 gpm minimum.

(6) Slowly increase pressure until flow from C2 reduces to approximately 166 cc per minute.

(7) Measure maximum flow obtained prior to flow reduction to 166 cc per minute. Maximum flow shall be 1.75 gpm.

(8) Measure pressure at which flow reduction to 166 cc per minute from C2 occurs. Pressure shall be 460 psi maximum.

(9) Reduce pressure to 200 psi and measure flow from C2. Flow from C2 shall be 0.97 gpm minimum.

(10) Connect port C1 to flowmeter and repeat previous tests (1) through (9) applying pressure to P-IN and port C2 simultaneously.

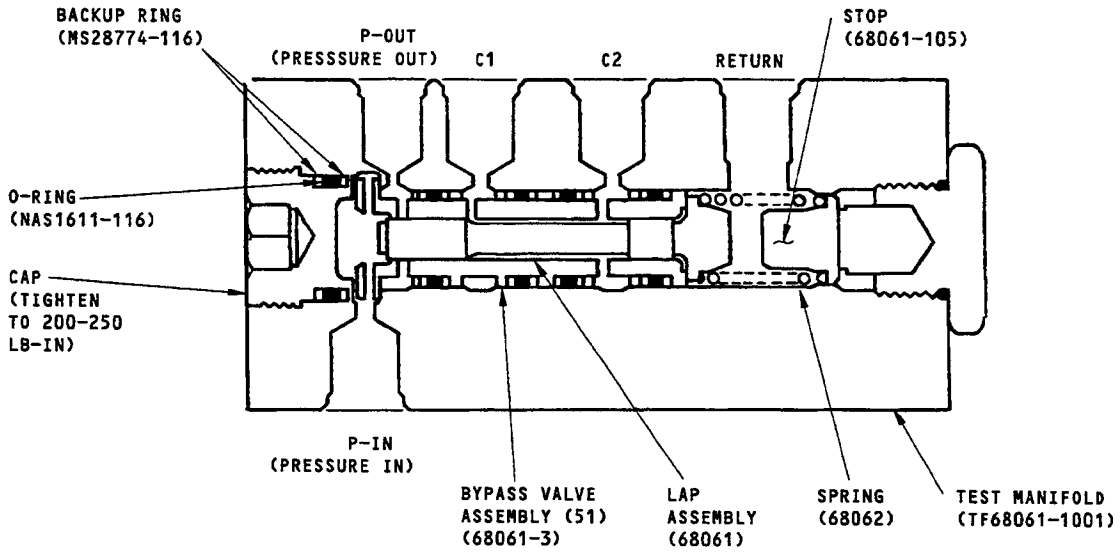
C. Leakage Test

(1) Install suitable plug in P-OUT (pressure outlet) port.

(2) Open R port and connect port C1 to flowmeter.

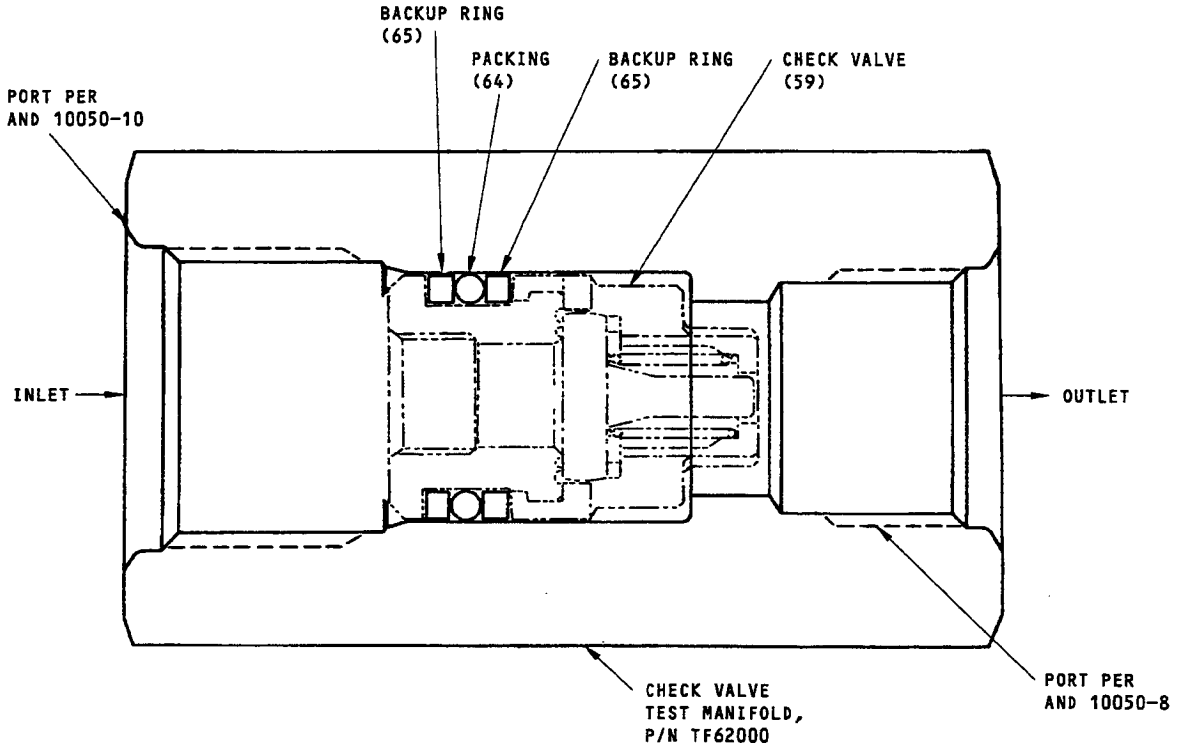
(3) With 3000-psi pressure applied to P-IN port and port C2, measured flow from R port shall not exceed 19 cc per minute.

(4) With pressure to C2 port reduced to 1500 psi, measure flow from port C1. Flow from port C1 shall be 209 to 409 cc per minute.



Bypass Valve Test Setup
Figure 709

F57841



NOTE: ITEM NUMBERS REFER TO FIG. 1101

F60177

Test of Check Valve
Figure 710

(5) Open port C2 and measure flow from ports C1 and C2 combined. Flow from ports C1 and C2 shall not exceed 6 cc per minute.

D. Bypass Flow Test

(1) With all other ports open and 50 -psi fluid pressure applied to P-IN port, measured flow from P-OUT port must be 0.05 to 0.20 gallon per minute.

7. Check Valve Pretest (Fig. 1101)

A. Proof Pressure Test

(1) Install check valve (59) in Test Manifold, part number TF62000, as shown on Test of Check Valve, Fig. 710.

(2) With free flow inlet port open, apply 5400 psi fluid pressure to check valve through outlet port.

(3) Hold pressure for 2 minutes then release pressure and examine valve. There must be no permanent distortion or damage to valve.

B. Leakage Test

(1) Connect free flow inlet port to a pipette.

(2) Apply 5 psi fluid pressure to outlet port, hold for 1 minute, and measure leakage. Leakage must not exceed 0.1 cubic centimeters in 3 minutes.

(3) Raise applied fluid pressure to 3000 psi, hold for 1 minute and measure leakage. Leakage must not exceed 0.1 cubic centimeter in 3 minutes.

C. Cracking Pressure Test

(1) Open outlet port.

(2) Gradually apply fluid pressure to free inlet port until flow occurs. Valve must crack at pressure of 2 to 8 psi.

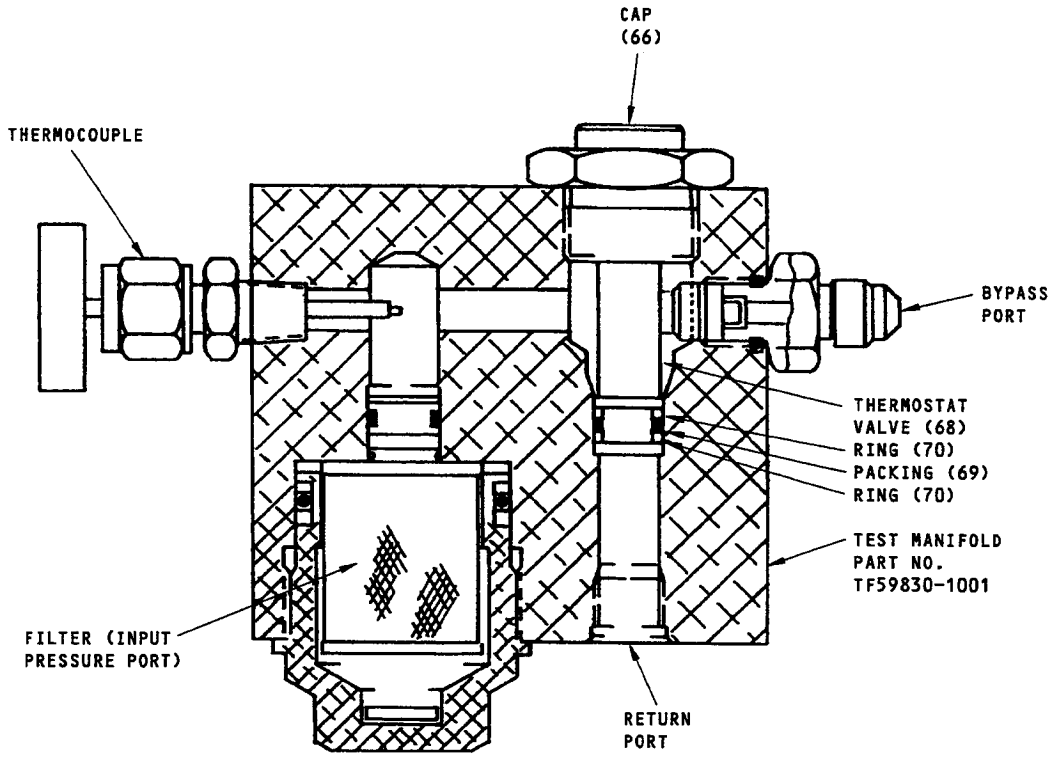
8. Thermostat Valve Assembly Test (Fig. 1101.)

NOTE: Use hydraulic fluid conforming to BMS 3-11 filtered to 10 microns as test fluid.

A. Pressure Test Preparation

(1) Install thermostat valve assembly (68) in Test Manifold Assembly, part number TF59830-1001, as shown in Hydraulic Thermostat Valve Test Fixture, Fig. 711.

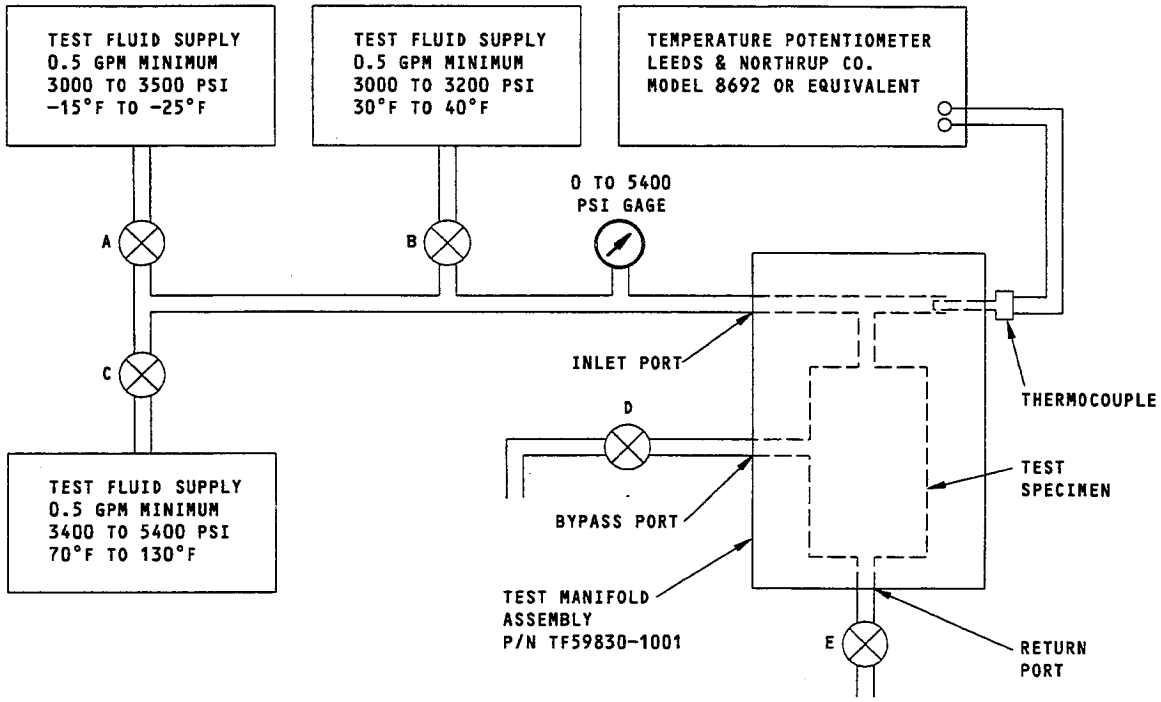
(2) Connect Test Manifold Assembly to test equipment as shown on Hydraulic Thermostat Valve Test Setup, Fig. 712.



NOTE: ITEM NUMBERS REFER TO FIG. 1101

F60188

Hydraulic Thermostat Valve Test Fixture
Figure 711



NOTE: 3/8 INCH OD TUBING
KEEP TUBING AS SHORT AS POSSIBLE

F57863

Hydraulic Thermostat Valve Test Setup
Figure 712

B. Proof Pressure Test

(1) Close valves A, B and D.

(2) Open valves C and E.

(3) Apply 5400 psi fluid pressure to inlet port for one minute, then remove pressure.

(4) Open inlet and bypass port and apply 3000 psi pressure to return port for one minute, then remove pressure.

(5) Examine thermostat valves for damage after the following tests are completed.

C. Operation to Opened Position and Flow Test.

(1) Close valves B and C, and open valves D and E.

(2) Open valve A, and adjust supply pressure to 3000 psi measured at inlet port.

(3) Stabilize temperature of test unit at -15°F to -25°F, as indicated by potentiometer.

NOTE: Valve (68) must be open as evidenced by flow from valve E.

(4) Close valve D.

(5) Measure flow from valve E. Flow must be 0.14 to 0.23 gpm.

D. Operation to Closed Position, and Leakage Test

(1) Close valves A and C, and open valves D and E.

(2) Open valve B and adjust supply pressure to obtain 3000 psi at inlet port.

(3) Stabilize temperature of test unit at 30°F to 40°F, as indicated by potentiometer.

NOTE: Valve (68) must be closed as evidenced by leakage flow only from valve E.

(4) Close valve D, and wait for two minutes.

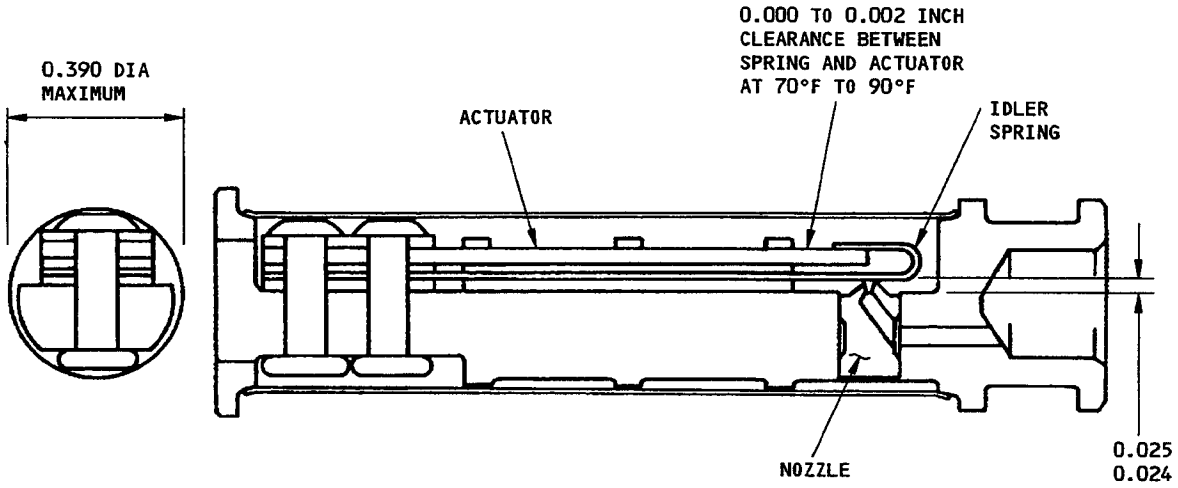
(5) Measured leakage from valve E must not exceed 50 cubic centimeters per minute.

E. If necessary to adjust operating range of valve (68), proceed as follows:

(1) Depress actuator until it touches lower part of idler spring, forcing idler spring against orifice tip with light pressure, as shown in Adjustment of Clearance After Test Fig. 713.

(2) Measure clearance, between idler spring tip and actuator, with wire feeler gauges. Clearance should be approximately 0.002 inch.

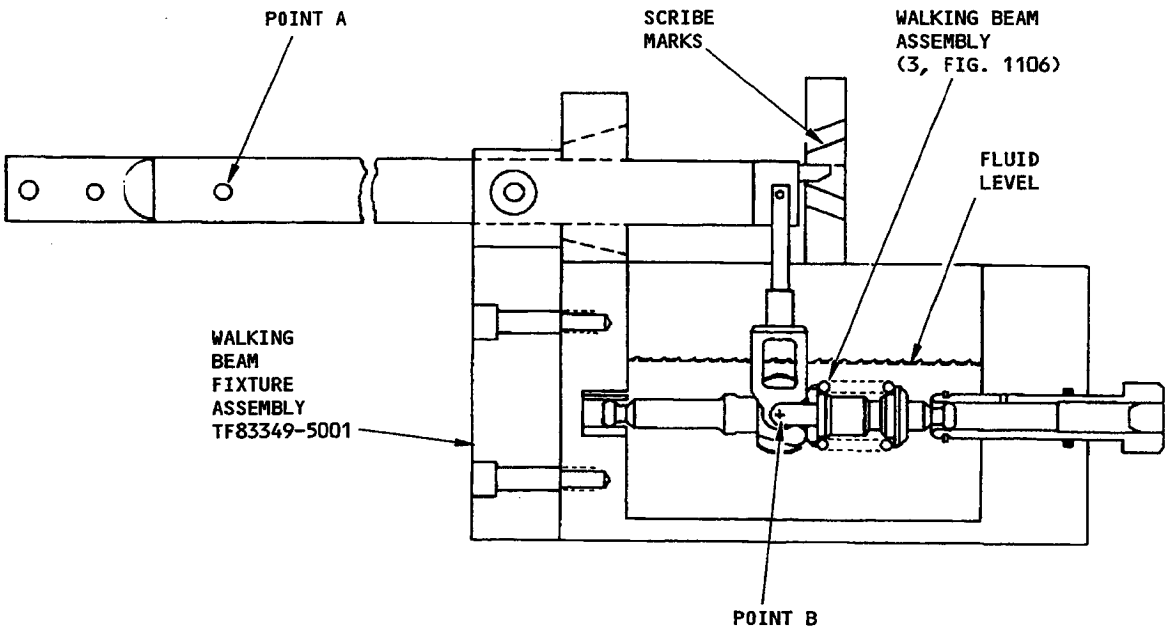
(3) To raise operating temperature range, decrease clearance by bending tip of idler spring.



ALL DIMENSIONS ARE IN INCHES

Adjustment of Clearance After Test
Figure 713

F57875



Testing Details for Walking Beam Assembly
Figure 714

(4) To lower operating temperature range, increase clearance by bending tip of idler spring.

NOTE: A change in clearance of 0.0016 inch will cause a change in operating temperature of approximately 10°F.

F. Visually examine valve assembly (68) for damage. There must be no damage from any of the previous tests.

9. Walking Beam Assembly Test (Fig. 1106)

A. Moisten bearing ends of walking beam assembly (3) with hydraulic fluid, BMS 3-11 and install in spring breakout force test fixture assembly, TF83349-5001 as shown in Fig. 714. Ball ends of walking beam assembly must be seated in cylindrical sockets of test fixture.

B. Fill body of test fixture with hydraulic fluid, BMS 3-11 until walking beam assembly is submerged.

C. Apply force at center of walking beam (point B, Fig. 714) and measure force required to flex joint. Force should be at least 40 pounds in both directions. This is equivalent to 20-pound force applied at point A on test fixture lever arm.

D. Measure amount of flexure at walking beam joint. Stroke should be 0.575 inch in both directions (maximum SCRIBE marks on test fixture scale).

10. Dual Servo Valve Assembly Pretest

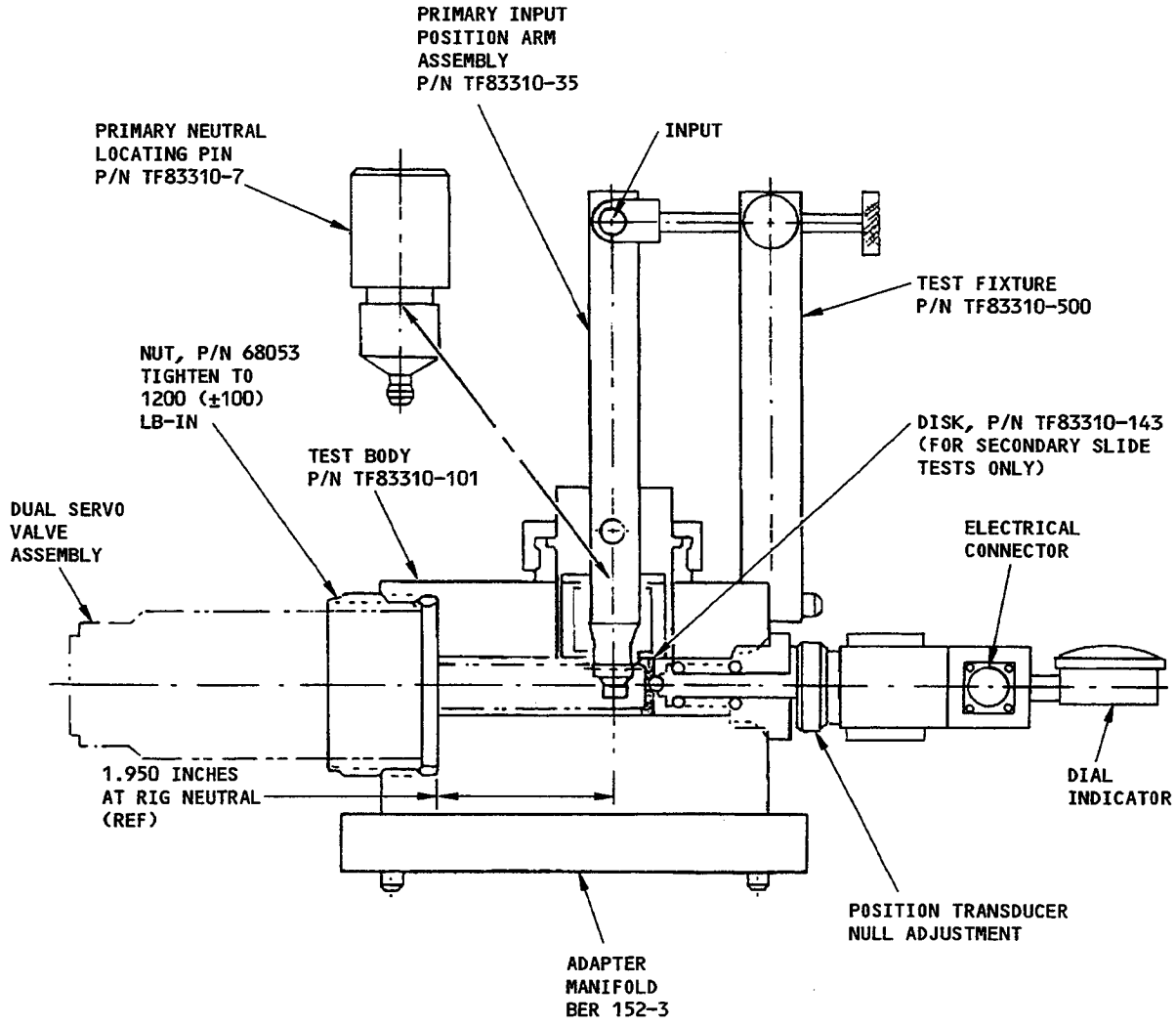
A. General

(1) Use X-Y flow console, part No. 77300- or 66600 or equivalent, and an X-Y recorder to plot slide positions and flows. Follow instructions provided with the X-Y flow console to obtain satisfactory X-Y plots (Fig. 716).

(2) Connect test valve to servo valve test fixture assembly, Part No. TF83310-5003, as shown in Fig. 715. Use appropriate 0-ring packings to seal fluid ports on test valve.

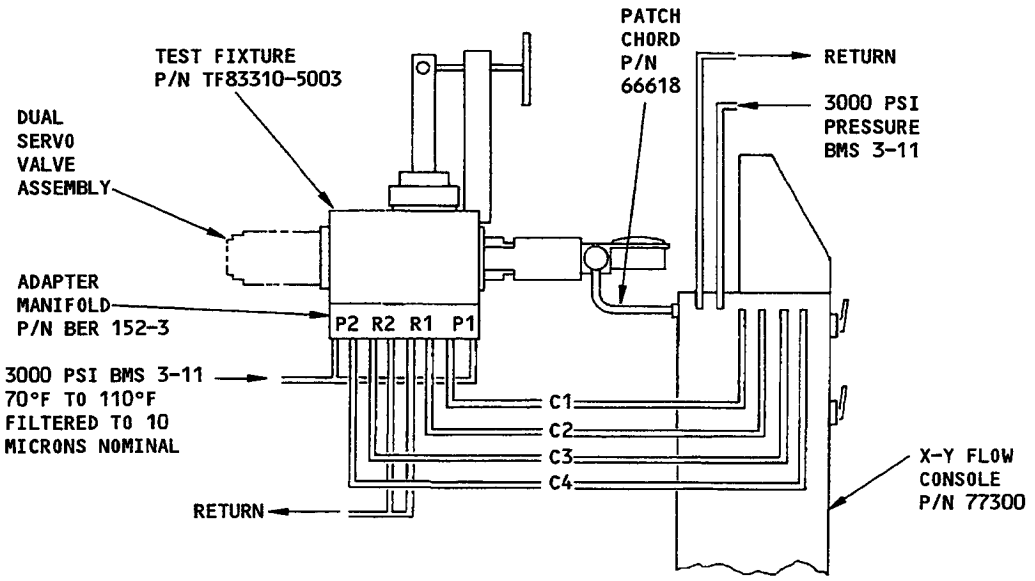
(3) Cycle test valve for approximately 2 minutes before starting secondary and primary slide tests. Adjust test fixture position transducer to obtain best null point with the valve at rig neutral before start of testing. Record rig neutral on the X-Y recorder plot after every curve taken.

(4) Unless otherwise specified, perform the following tests with 3000-psi inlet pressure to ports P1 and P2, both return ports open, and the cylinder ports connected to the X-Y flow console. All port references in this instruction and in the following test procedures refer to the ports on a Bertea Corporation Adapter Manifold, Part No. BER 152.



Dual Servo Valve Test Fixture Setup
Figure 715

F58440



X-Y Flow Console and Test Fixture Setup
Figure 716

F57911

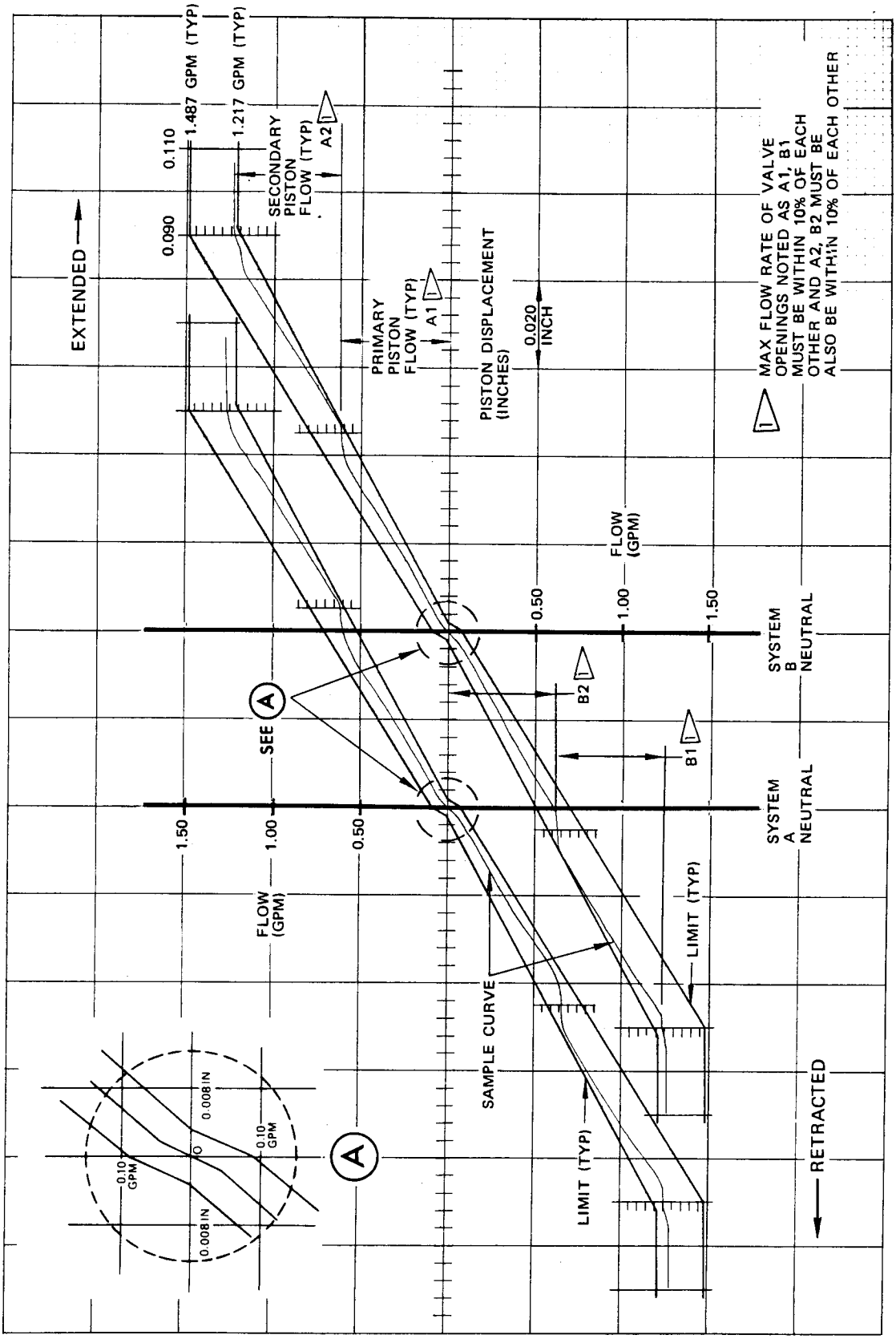
B. Primary and Secondary Slide Flow.

(1) Install primary slide input position arm assembly P/N TF83310-35.

(2) Connect cylinder ports to flow console (relief valve and pressure regulator of flow console set at 1450 to 1550 psi).

(3) Apply 3000 psi pressure to ports P1 and P2.

(4) Operate primary slide input position arm and record flow versus slide travels of both A and B systems for full strokes (primary plus secondary strokes). The flow versus valve stroke plot must be within limits specified in Fig. 717.



Piston Flow Check Curves
Figure 717

C. Cylinder Pressure

(1) Adjust flow console controls to interconnect cylinder port C1 and C2 of system A and C3 and C4 of system B.

(2) Apply pressure to ports P1 and P2.

(3) Operate primary slide input position arm and record cylinder pressures on both A and B systems for a 0.060-inch slide displacement each side of rig neutral position. For valve slide displacements in either direction, cylinder pressures must be:

(a) 900 to 2100 psi throughout valve stroke on overhaul valve.

(b) 300 to 2700 psi throughout valve stroke on valve in service.

D. Neutral Cylinder Pressure and Pressure Gain

(1) Adjust flow console controls to block cylinder ports C1 and C2 of system A and C3 and C4 of system B.

(2) Apply 3000 psi to pressure ports P1 and P2.

(3) Operate primary slide input position arm and record cylinder pressures from 0 to 3000 psi on both A and B system at each cylinder port.

(a) Neutral cylinder pressure (point where C1 and C2 cross and C3 and C4 cross on plot) must be:

1) 1000 to 2000 psi on overhauled valve

2) 300 to 2700 psi on valve in service.

E. Neutral Position

(1) Install pressure gages at each cylinder port, C1, C2, C3 and C4.

(2) Apply 3000 psi to pressure ports P1 and P2.

(3) Operate primary slide as required to determine position of system A and B hydraulic neutral with respect to the rig neutral position (determined by use of primary neutral locating pin, P/N TF83310-7).

NOTE: Hydraulic neutral is primary slide position when C1 and C2 (or C3 and C4 in system B) pressures are equal within 25 psi.

(a) Hydraulic neutral of system A and B must be located within ± 0.001 inch of rig neutral position. Hydraulic neutral of system A and B must also match within 0.0002 inch.

F. Neutral Flow and Lap Leakage

(1) With pressure gages installed in control ports, apply 3000 psi pressure to ports P1 and P2.

(2) Measure leakage from port R1 at system A hydraulic neutral and from R2 at system B hydraulic neutral.

(a) Neutral leakage from each system, A and B, must not exceed:

1) 260 cc per minute from each return port on overhauled valve.

2) 750 cc per minute from each return port on valve in service.

(3) Measure leakage from ports R1 and R2 with valve slide displaced to 0.090 inch each side of neutral.

(a) Lap leakage from each system, A and B, must not exceed:

1) 94 cc per minute from each return port on overhauled valve.

2) 150 cc per minute from each return port on valve in service.

G. Flow Forces

(1) Remove position transducer and indicator assembly.

(2) Interconnect cylinder ports C1 to C2 and C3 to C4.

(3) Apply 3000 psi pressure to ports P1 and P2.

(4) Attach a spring scale to primary input position arm of test fixture.

(5) Measure force required to displace primary slide in both directions from rig neutral position to detent position for secondary slide. Force required must not exceed 24 ounces (48 ounces at slide) in either direction.

H. Primary Slide Friction

(1) Install pressure gages at each cylinder port, C1, C2, C3 and C4.

(2) Apply 3000 psi pressure to ports P1 and P2

(3) Attach a spring scale to primary input position arm of test fixture.

(4) Measure force required at input arm to stroke primary slide through rig neutral position against bias spring. Force required at input arm to produce 3000 psi pressure at ports C2 and C4 must not exceed 12 ounces (24 ounces at slide). As this force is slowly reduced, the force required to obtain 3000 psi pressure at ports C1 and C3 must not be less than four ounces (8 ounces at slide).

I. Secondary Slide Friction

(1) With cylinder ports plugged, apply pressure to ports P1 and P2.

(2) Measure force required to move slide from detent position to valve stop in one direction. Force must not exceed 10 pounds (20 pounds at slide).

(3) Reduce force applied to input arm slowly until slide starts to return to detent position. The force difference (step 2 less step 3) must not exceed 3 pounds (6 pounds at slide).

(4) Repeat steps (2) and (3) except in opposite direction.

11. Functional Testing of Assembled Rudder Power Control Unit

A. Check continuity of wiring per wiring diagram (Fig. 403, Fig. 403A).

B. Coil Resistance Check (Fig. 403)

(1) Measure coil resistances with a standard ohmmeter across following pins of control package electrical receptacle. Resistances at 70°F ambient temperature must be as follows:

PIN to PIN		RESISTANCE
1	2	71-87 ohms (Solenoid valve P/N 59600-( ))
1	2	72-76 ohms (Solenoid valve P/N 881600-1001)
1	2	49-62 ohms (Solenoid valve P/N 45080)(at 77°F)
1	2	79-115 ohms (Solenoid valve P/N 45080-1)(at 77°F)
5	6	900-1100 ohms
7	8	900-1100 ohms
1	4	0 ohms (short)
9	10	80-165 ohms
11	12	60-135 ohms
3	other	Infinite (no connections)

C. Dielectric Strength

(1) Using the Hypot listed in Special Tools, Fixtures and Equipment section, gradually apply indicated voltages and hold for a period of 5 seconds (Fig. 403), 1 minute (Fig. 403A). There must be no arcing or insulation failure. Reduce voltage to zero before removing connections.

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

NOTE: Dielectric strength is typical for respective connectors in Fig. 403 or Fig. 403A.

(2) Apply 1500 volts ac across the receptacle body to pin 2 (Fig. 403).

(3) Apply 1500 volts ac across the receptacle body to pin 1 (Fig. 403A).

(4) With receptacle body and pins 2, 5, 7 connected to common lead, apply 1000 volts ac between common lead and pin 9. Repeat between common lead and pin 11 (Fig. 403).

(5) With receptacle body and pins 1, 5, 7 connected to common lead, apply 1000 volts ac between common lead and pin 11. Repeat between common lead and pin 9 (Fig. 403A).

(6) Apply 800 volts ac between pins 5 and 7. Repeat between pins 9 and 11 (Fig. 403A).

D. Insulation Resistance Tests (Fig. 403)

(1) Using megger, measure insulation resistance between each of following connections with 500 volts dc applied. Insulation resistance must be 100 megohms minimum at each connection for overhauled unit or 10 megohms for unit in service.

(a) From receptacle body to pins 1, 5, 7, 9, and 11

(b) From pin 1 to pins 5, 7, 9, and 11

(c) from pin 5 to pins 7, 9, and 11

(d) From pin 7 to pins 9 and 11

(e) From pin 9 to pin 11

E. Secondary Slide Displacement Test for Dual Servo Valve Assembly (40, Fig. 1106). Item numbers below refer to Fig. 1108. This procedure is a test for the dual servo valve secondary slide P/N 398313-1 (Ref SB 737-27A1221R1). Prior to doing the test make sure the test fixture 381510TF3 is correctly calibrated. This should be done at start of new testing and at least once a week during repeated testing. The test fixture is calibrated using the calibration fixture 381510TF3-45, signal box 381510TF50 and cable 381510TF60. The calibration procedure and calibration fixture are supplied with the test fixture 381510TF3.

(1) Make sure that all hydraulic fluid sources are removed from test fixture TF83300-5001 or equivalent.

(2) Install control unit in test fixture TF83300-5001 or equivalent. (Ref Fig. 720)

NOTE: Do not make electrical and hydraulic connections at this time.

(3) Install displacement test fixture 381510TF3 (Fig. 718)

(a) Remove cap (1), packing (2) and spring (3).

CAUTION: Make sure that the LVDT probe is not damaged when installing adapter assembly 381510TF3-25.

(b) Insert adapter assembly 381510TF3-25 into the secondary slide pin (16) and rotate 90 degrees clockwise. Make sure that the adapter assembly is engaged with the pin in the secondary slide.

(c) Install nylon insert 381510TF3-29 on the arm of the positioner assembly 381510TF3-31.

(d) Install positioner assembly 381510TF3-31 onto the body of the displacement test fixture 381510TF3.

CAUTION: When the displacement test fixture is partially engaged, side loads or bending loads may damage the servo valve.

(e) Install the displacement test fixture 381510TF3 onto the servo valve assembly. Screw the test fixture hand tight, make sure that there is no free play between the test fixture body and the servo valve body.

(f) Insert pin 381510TF34-19 through one of the slots in the positioner, the slot in the test fixture body, and the hole in the adapter assembly (two positions are shown, use only one). Turn the handscrew knob and rotate the sleeve 381510TF3-3 as necessary to align the holes and slots.

NOTE: Make sure that the nylon insert in the arm of the positioner assembly rests against the aft piston of the PCU. Use and elastic band (not shown) to hold the positioner assembly against the piston during the displacement test.

(4) Set up and calibrate the X-Y recorder (Fig. 718)

NOTE: A full size MYLAR plot is supplied with the displacement test fixture. Do not use this plot directly on the recorder. A copy of the plot fits on 11 inch by 17 inch paper.

(a) Insert plot paper.

(b) Calibrate the recorder. These calibration factors are for the supplied plot provided with the displacement test fixture.

1) Set the Y-axis to a calibrated scale of 0.1 volt/inch.

2) Set the X-axis to a calibrated scale of 1.0 volt/inch.

3) Make sure the X-Y recorder is set up to use the calibrated scale, do not use a vernier scale.

(c) Connect the signal box output cables.

1) Connect the position output (POS) to the Y-axis of the recorder.

2) Connect the load cell output (FORCE) to the X-axis of the recorder.

(d) Turn the signal box switch to the CAL 1 position (the switch is at the rear of the signal box). Make sure that the power switch on the signal box is in the ON position.

(e) Move the recorder pen over the point labeled CAL 1 on the plot.

(f) Mark the pen position on the plot paper. Make sure that the pen makes a mark on the point labeled CAL 1.

(g) Turn the signal box switch to the CAL 2 position.

(h) Note the recorder pen position. Make sure that the pen is positioned within the box labeled CAL 2. If the pen is not positioned within the box, do steps (b) thru (h) again.

(i) Mark the pen position on the plot paper. Make sure that the pen makes a mark within the box labeled CAL 2.

(j) Turn the signal box switch to the OPER position.

(k) Connect the signal box cable 381510TF60-1001 from connector J4 on the signal box 381510T50-1001 to the connector on the displacement test fixture.

(5) Do the displacement test of the secondary slide.

(a) Turn the hand screw knob 381510TF3-11 slowly counterclockwise until the digital force display on the signal box shows a load of 70.0-90.0 pounds.

(b) Turn the hand screw knob clockwise to the neutral position (the display on the signal box shows less than a 1.0 pound load).

(c) Turn hand screw knob slowly counterclockwise until the display on the signal box shows a load of 38.0-42.0 pounds. After the load exceeds 38.0 pounds, do not turn the hand screw knob in a clockwise direction. If the load exceeds 42.0 pounds, do steps (a) and (b) again.

(d) Adjust recorder with 40.0 pounds tension applied, adjust the X-axis and Y-axis to the plot origin.

NOTE: Use the offset capability of the signal box to position the pen near the plot origin, then use the positioning function of the recorder to position the pen over the origin.

CAUTION: Do not exceed 180.0 pounds load. Audio and visual alarms will come on if the load exceeds 180.0 pounds. If the alarms come on, contact Boeing Customer Engineering for instructions.

(e) Record load and displacement.

1) Begin recording.

2) Turn the hand screw knob on the test fixture slowly counterclockwise until the display on the signal box shows a load of 140.0-160.0 pounds.

3) Stop recording.

(f) Turn the hand screw knob clockwise to the neutral position (the display on the signal box shows less than a 1.0 pound load).

(g) Make sure the displacement is 0.004-0.007 inch when the load is 150 pounds, and that the displacement plot is within the plot limits shown in Fig. 718.

(h) If test results of displacement test are not satisfactory, then check test set up and calibration of test equipment. Repeat test, if results are still not satisfactory then remove secondary slide (13) from the PCU using disassembly instructions. Perform a dye penetrant check per the Check section of the OHM. If the secondary slide fails the dye penetrant check then contact the Boeing company for instructions. If the secondary slide passes the dye penetrant check then reassemble the secondary slide in the PCU and repeat the test.

(6) Remove the displacement test fixture and reassemble the dual servo valve.

(a) Disconnect the X-Y recorder from the signal box 381510TF50-1001.

(b) Disconnect the signal box cable 381510TF60-1001 from the displacement test fixture and from the signal box.

(c) Remove pin 381510TF34-19. Turn hand screw and rotate the sleeve 381510TF3-3 as necessary to disassemble parts.

CAUTION: When the displacement test fixture is partially engaged, side loads or bending loads may damage the servo valve.

(d) Remove the displacement test fixture 381510TF3 from the servo valve assembly.

(e) Remove positioner assembly 381510TF3-31 from the body of the displacement test fixture.

(f) Remove the nylon insert 381510TF3-29 from the arm of the positioner assembly.

CAUTION: Make sure that the LVDT probe is not damaged when removing adapter assembly 381510TF3-25.

(g) Remove the adapter assembly 381510TF3-25 from the secondary slide pin by rotating 90 degrees counterclockwise.

(h) Remove the adapter assembly from the secondary slide pin.

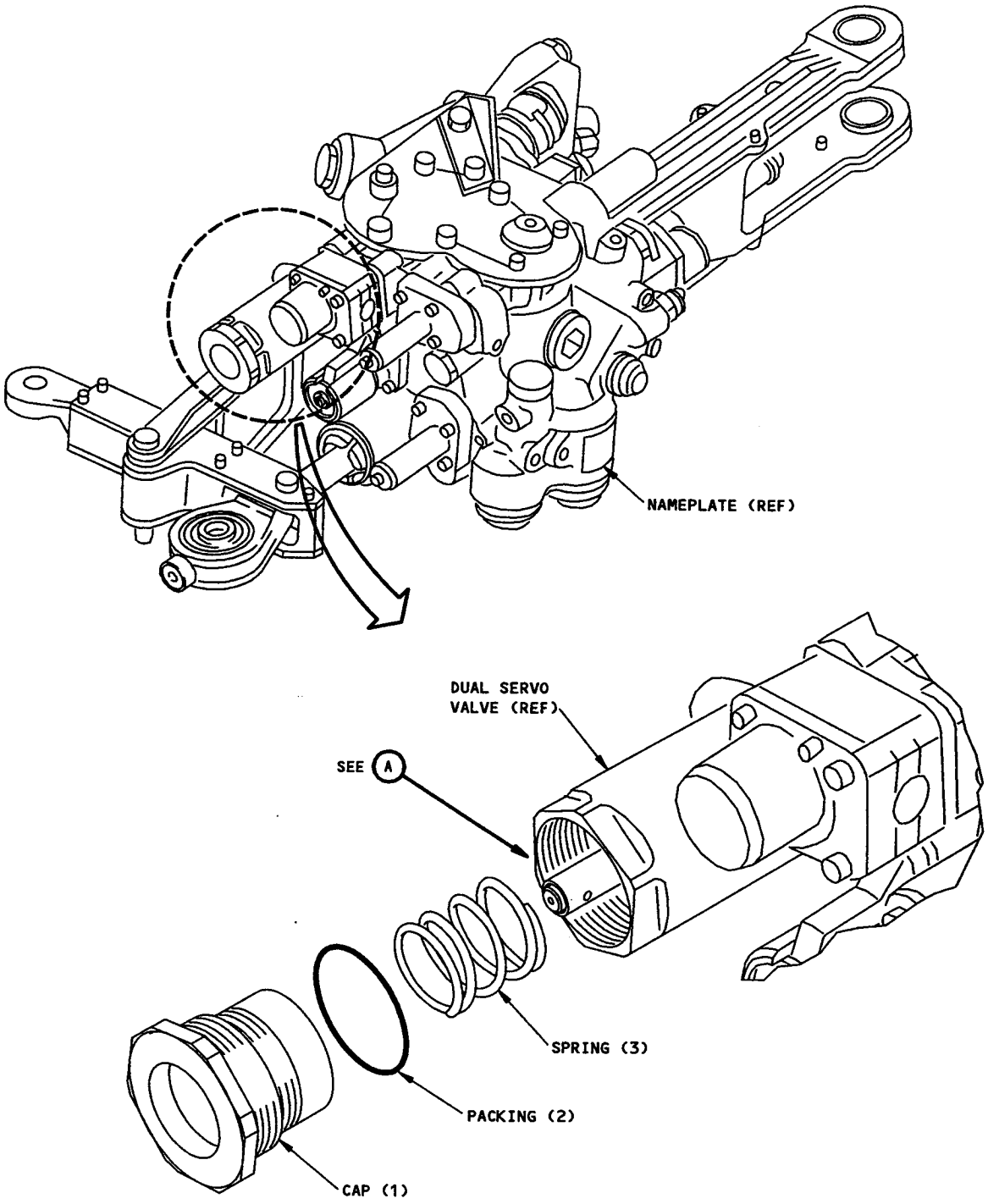
(i) Assemble dual servo valve assemblies 398310-1001, -1003

NOTE: Make sure slot of guide (10) aligns with pin (11G).

1) Install packing (2) on cap (1).

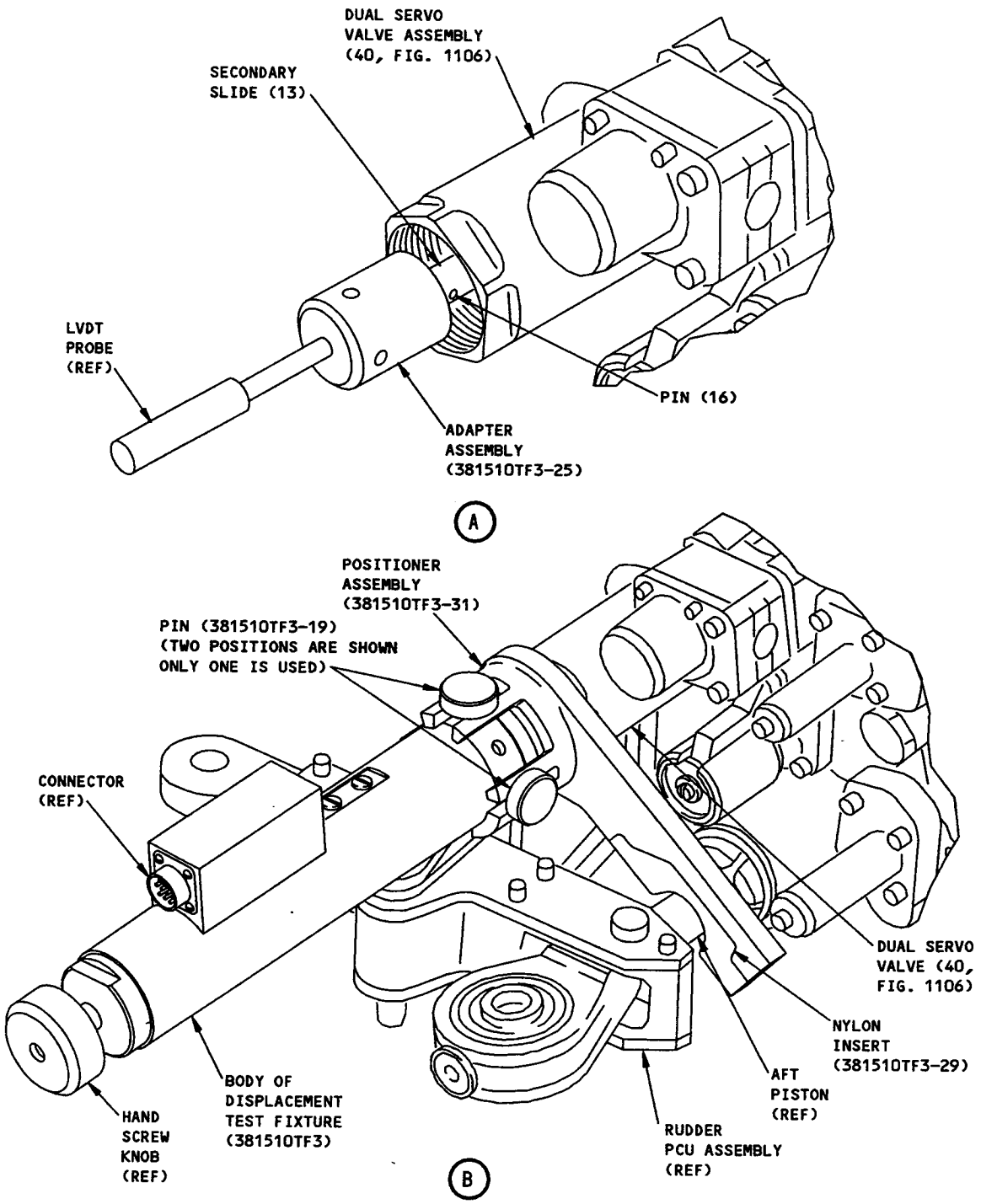
2) Install spring (3) and cap (1) in body assembly (15).

3) Tighten cap (1) to a torque range of from 75 to 80 pound-inches.



INSTALLATION OF THE TEST FIXTURE ON THE PCU

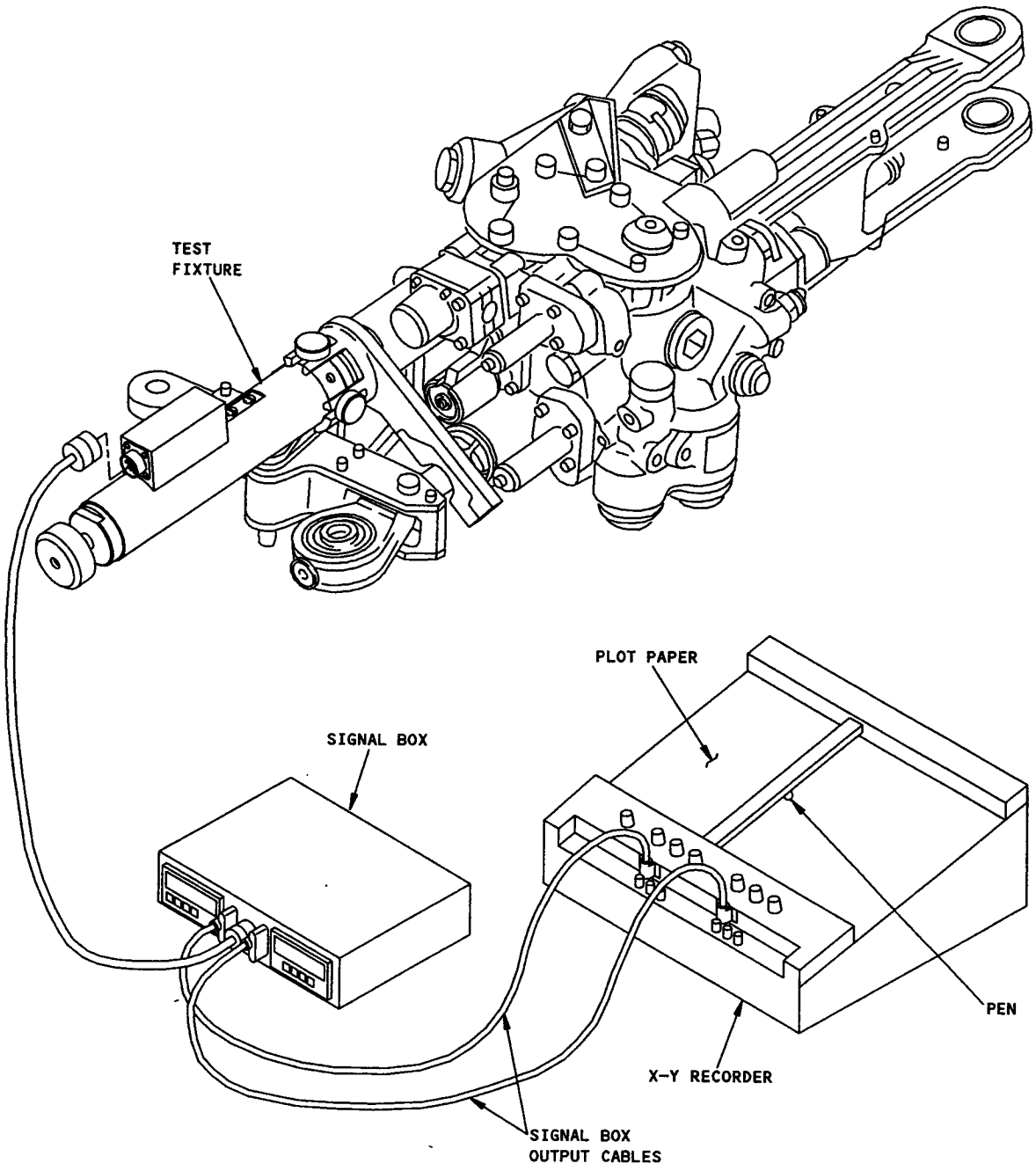
Displacement Test of the Dual Servo Valve Secondary Slide
Figure 718 (Sheet 1)



INSTALLATION OF THE TEST FIXTURE ON THE PCU

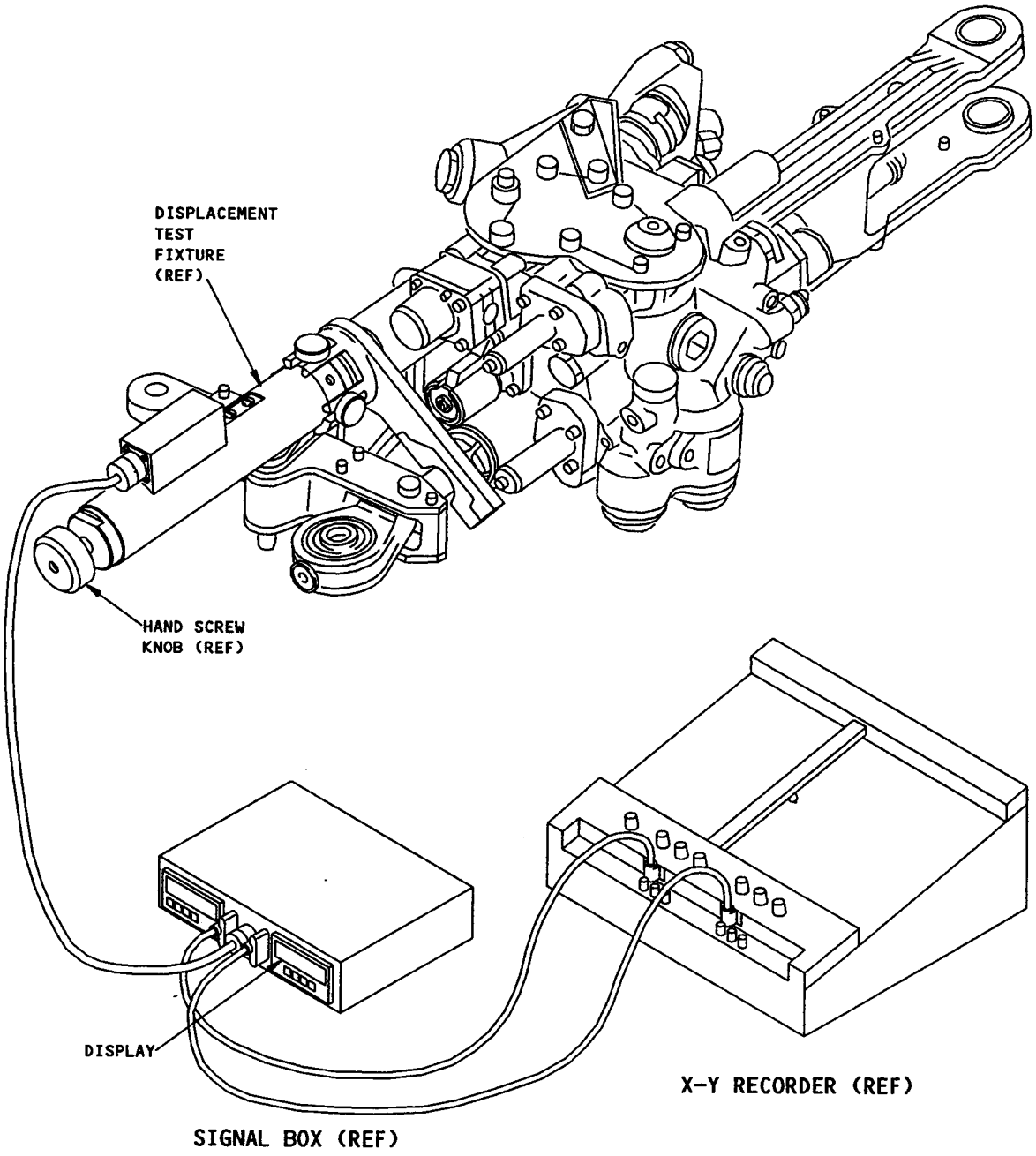
Displacement Test of the Dual Servo Valve Secondary Slide
Figure 718 (Sheet 2)

K27795



SET UP AND CALIBRATION OF TEST EQUIPMENT

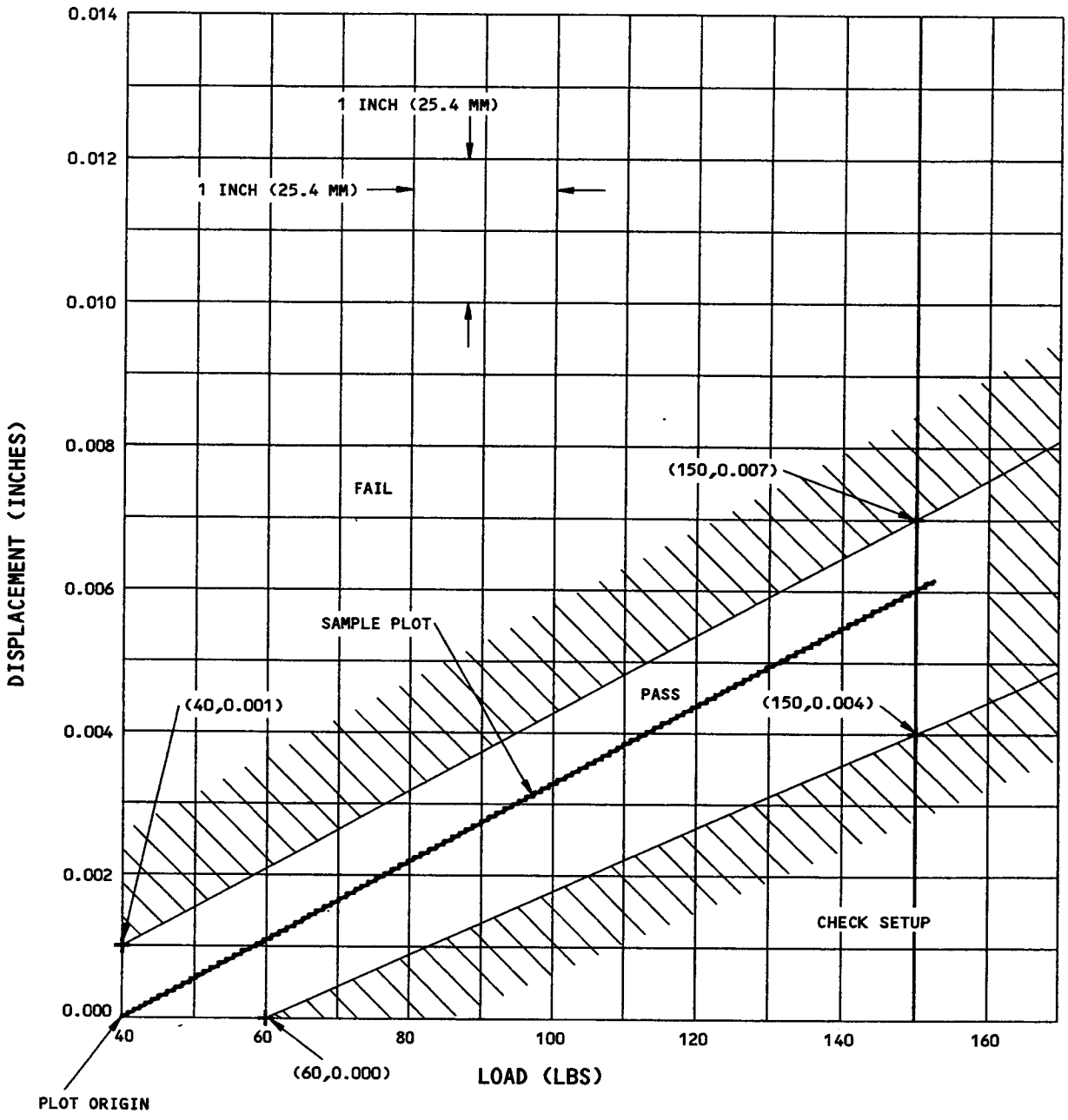
Displacement Test of the Dual Servo Valve Secondary Slide
Figure 718 (Sheet 3)



DISPLACEMENT TEST OF THE SECONDARY SLIDE

Displacement Test of the Dual Servo Valve Secondary Slide
Figure 718 (Sheet 4)

K27877



CAUTION: DO NOT EXCEED 180 POUND LOAD (800,64N)

NOTE: SAMPLE PLOT ONLY. CALIBRATE X-Y RECORDER AS IN STEP 11.E (4)

SAMPLE PLOT - LOAD VS. DISPLACEMENT

Displacement Test of the Dual Servo Valve Secondary Slide
Figure 718 (Sheet 5)

12. Hydraulic and Operational Tests - Assembled Rudder Power Control Unit

NOTE: For overhauled unit, perform tests per par. 12. For unit removed from service for any cause other than yaw oscillation (fishtailing), perform only applicable part of test per par. 12. For unit removed because of yaw oscillation (fishtailing), perform test per par. 13.

Units "in service" referred to in the following tests are units removed due to known or suspected malfunctioning characteristics and for which testing is desired to determine further disposition. Units which meet the "in service" limits may be returned to service without overhaul.

Test limits for units in service are the same as for overhauled units unless otherwise noted.

A. Preparation for Test

(1) Unless otherwise specified, the following tests are performed with 3000 psi hydraulic pressure at ports Pa and Pb and 75 psi at ports Ra and Rb. Switches with prefix S or SY referred to in test procedures are located on Bertea Corporation Electric Test Cabinet, TF94900-1009, or equivalent (Fig. 719). The system selector and other switches are located on the switch box of Bertea Corporation Test Fixture TF83300-5001 or equivalent (Fig. 720).

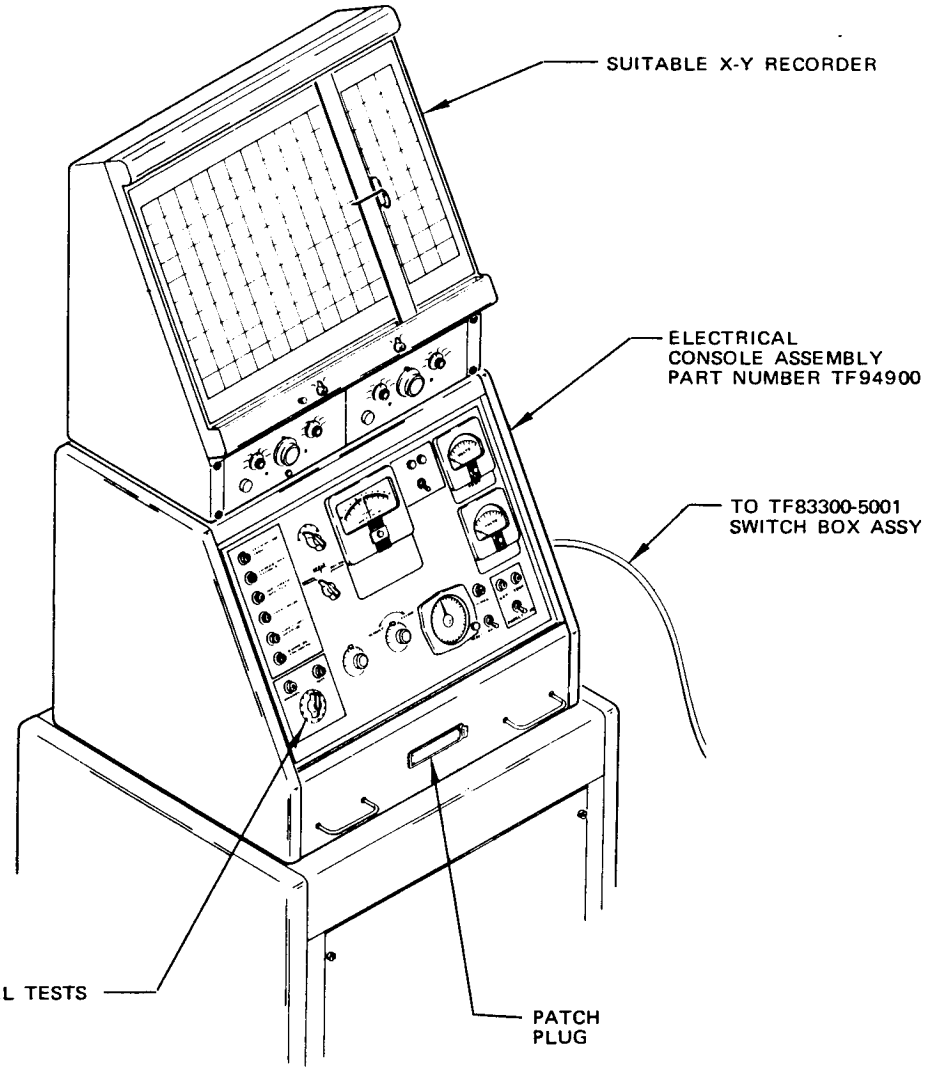
NOTE: Cabinets TF94900-1001, -1005, -1009 are for use with 60-Hz, 120-volt power service. Cabinets TF94900-1003, -1007, -1011 are for use with 50-Hz, 220-volt power service.

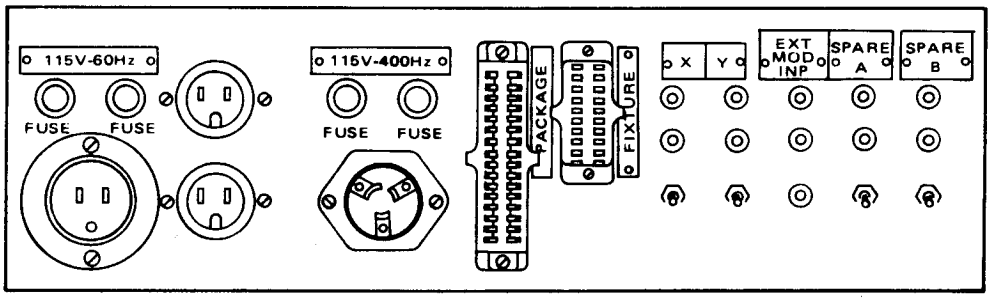
(2) Install hydraulic fittings per Fig. 1111.

(a) Apply hydraulic fluid BMS 3-11 or Skydrol Assembly Lube MCS 352 to packings (2 and 5) and threads of unions (1 and 3) and reducer (4) prior to installation.

(b) Place packings (2) on unions (1) and install in power control unit assembly (6).

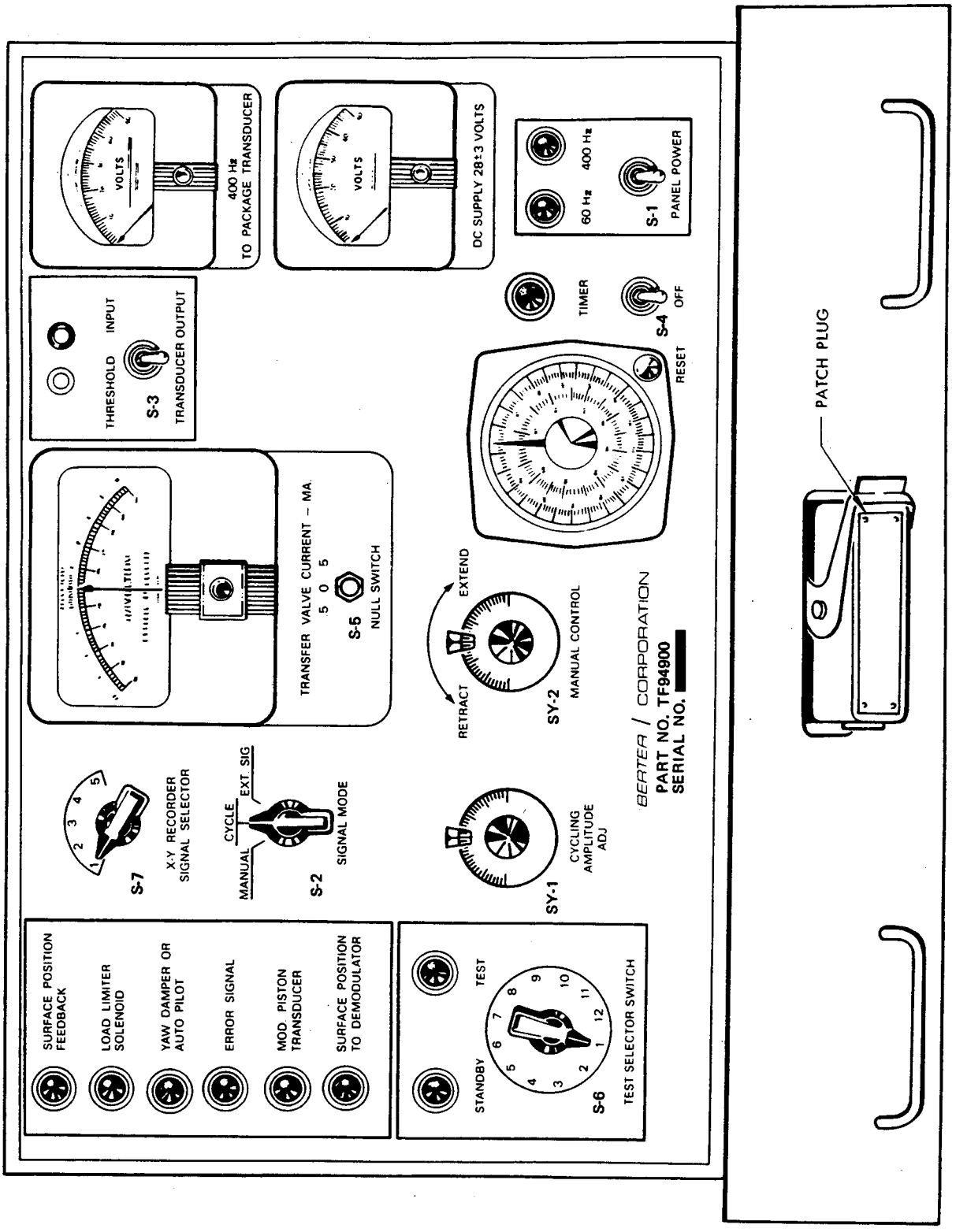
(c) Place packings (5) on union (3) and reducer (4), and install in power control unit assembly (6).



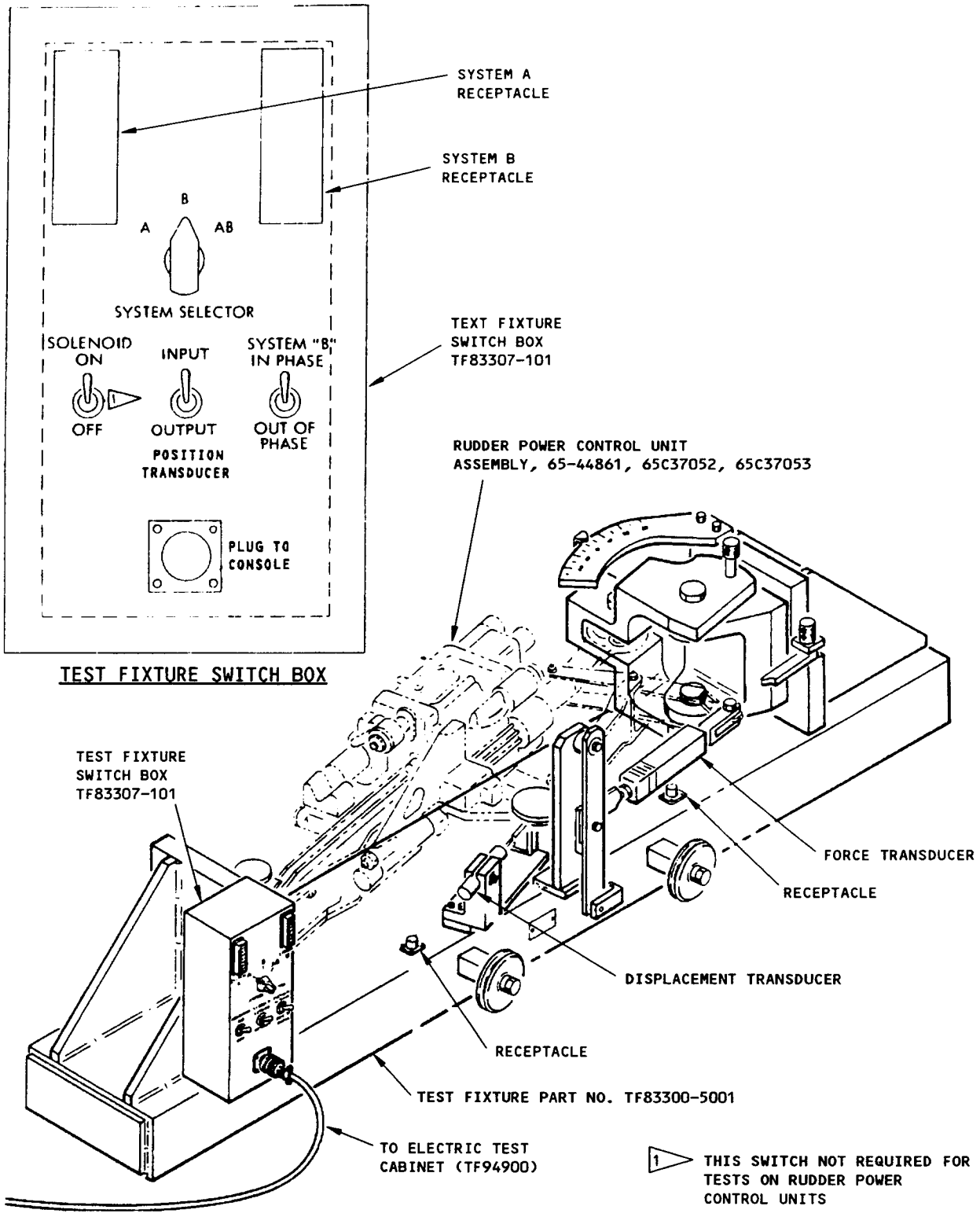


REAR VIEW

Electric Test Cabinet (Bertea Products)
Figure 719 (Sheet 1)

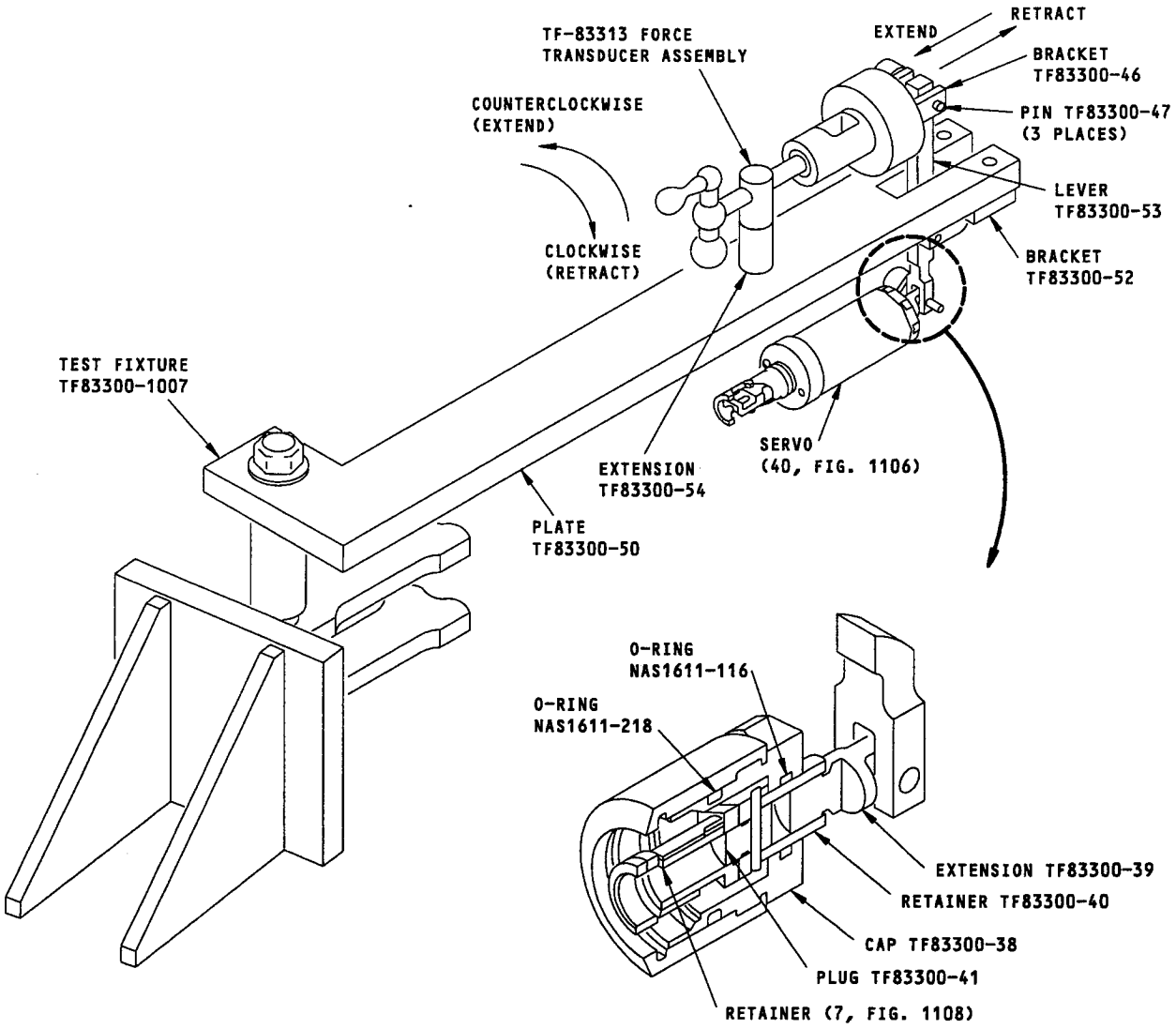


Control Panel of Electric Test Cabinet
Figure 719 (Sheet 2)



Rudder PCU Test Fixture Assembly
Figure 720

G78608



Rudder PCU Test Fixture Assembly
Figure 720A

884677

(3) Install control unit in test fixture TF83300-5001 or equivalent. Make necessary electrical connections and hydraulic equipment connections and energize cabinet.

(4) Use rig pin to hold input lever (28, Fig. 1105) in RIG NEUTRAL position unless otherwise noted.

(5) The following tables in Fig. 721 indicate the electrically energized components and circuits at numbered control knob positions of the Test Selector Switch, X-Y Recorder, Selector Switch and Demodulator Switch.

Table I

CABINET TEST SELECTOR (S-6) SWITCH POSITION	1	2	3	4	5	6	7	8	9	10	11	12
TRANSFER VALVE		X		X	X	X		X	X	X		
SOLENOID VALVE (AUTO-PILOT - YAW DAMPER)		X		X		X		X		X		
YAW DAMPER ACTUATOR TRANSDUCER				X *[1]	X *[1]	X				X		
SURFACE POSITION TRANSDUCER *[3]						X			X	X		
ERROR SIGNAL	X *[2]	X		X				X		X		

*[1] LVDT Output to transducer output jacks only (S-3 in transducer output position).

*[2] Circuit is energized, but not the error signal light on panel.

*[3] Input or output position transducer is determined by position transducer switch on test fixture switch panel.

TABLE II			
S-7 (X-Y Rec. Select Pos.)	S-6 (Test Sel. Pos.)	At X Axis Jack	At Y Axis Jack
1	6, 9 or 10		Force Transducer (Pilot Input)
2	Any	Position Transducer (Actuator input or output)	Force Transduer (Pilot Input)
3	9	Position Transducer (Actuator input or output)	
4	10	TV Input Signal (Input command)	
5	10	TV Input Signal (Input command)	Position Transducer (Actuator input or output)

Test Selector (TS) Switch Positions
Figure 721 (Sheet 2)

B. Proof Pressure Test - Return Passages

NOTE: The following tests are not required for units in service.

(1) Set up for test as follows:

(a) Turn S-6 to position 2.

(b) Turn S-2 to MANUAL.

(c) Turn SY-2 to NULL position.

(d) Turn test fixture selector to AB (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10 and 65C37053-2, -3, -4, -10) or to B (65-44861-5 thru -9, -11, -12, 65C37052-5 thru 9 and 65C37053-5 thru -9) .

(e) Set input lever (28, Fig. 1105) in RIG NEUTRAL position.

(f) Close ports Ra and Rb. Apply pressure to ports Pa and Pb.

(2) Gradually increase pressure at Pa, Pb to 3000 psi and hold for minimum of 2 minutes.

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

(4) (5) Deleted.

(6) Check that there is no external leakage, permanent set, or intersystem leakage.

C. Secondary Stroke/Flow Test (Fig. 720A and 1108)

NOTE: This test is only applicable to rudder PCUs which use dual servo valve P/N 68010-5005 or 68010-5007 (40, Fig. 1106). This includes Rudder PCU P/Ns 65-44861-11 and 65C37052-2 thru -10.

(1) Set up for test as follows:

(a) Remove pressure from Pa and Pb.

(b) Turn S-6 to position 3.

(c) Install test fixture TF83300-1007 on test fixture TF83300-5001.

CAUTION: VERIFY THAT HYDRAULIC SEALS ARE ON TEST FIXTURE PER FIG. 720A BEFORE ASSEMBLY.

(d) Prepare valve assembly (40, Fig. 1106) for test by removing parts (1 thru 6) and then connect to test fixture TF83300-1007. Torque cap TF83300-38 to 15 to 25 pound-inches.

CAUTION: DO NOT TORQUE TF83300-41 PLUG INTO RETAINER (7), FINGER TIGHTEN ONLY.

(e) Pin lever TF83300-53 to extension TF83300-39 and to bracket TF83300-52 of test fixture TF83300-1007.

(f) Apply pressure to ports Pa and Pb.

(2) Gradually increase pressure at Pa and Pb to 3000 psi.

CAUTION: IF MOTION OF THE UNIT IS ENCOUNTERED WHILE APPLYING A FORCE TO THE SECONDARY SLIDE TEST ARM, RELEASE FORCE IMMEDIATELY. RELEASING THE FORCE WILL PRECLUDE DAMAGING THE TEST FIXTURE.

(3) Manually move pilot input to the external extend-stop and hold at that point. After the unit has fully extended, slowly turn the TF83300-1007 crank counterclockwise until the force transducer reads 25 lbs. Wait until return flow is stabilized. Measure and record leakage at open ports Ra and Rb. The unit shall not move after 25 lbs. is applied to lever TF83300-53, and leakage at each return port must not exceed the following:

(a) 300-700 cc/min for overhauled unit

(b) 300-1085 cc/min for unit in service

(4) After recording leakages, slowly turn the TF83300-1007 crank clockwise until the force transducer reads zero load. Remove the TF83300-47 pin from the TF83300-39 extension.

(5) Manually move pilot input to the external retract-stop and hold at that point. After the unit has fully retracted, reinstall the TF83300-47 pin into the TF83300-39 extension. Slowly turn the TF83300-1007 crank clockwise until the force transducer reads 25 lbs. Wait until return flow is stabilized. Measure and record leakage at open ports Ra and Rb. The unit shall not move after 25 lbs. is applied to lever TF83300-53, and leakage at each return port must not exceed the following:

(a) 300-700 cc/min for overhauled unit

(b) 300-1085 cc/min for unit in service

(6) Remove pressure from Pa and Pb.

(7) Remove test equipment TF83300-1007 in the reverse order installed.

(8) Install guide (6), spring (5), and pin (4) in retainer (7).

(9) Install packing (2) on cap (1).

(10) Install spring (3) and cap (1) in insert assembly (15).

(11) Tighten cap (1) to a torque of 15 to 25 pound-inches.

D. Proof Pressure Test-Pressure Passages

NOTE: The following tests are not required for units in service.

CAUTION: DO NOT OPERATE UNIT WITH 5400 PSI INLET PRESSURE. ALWAYS REDUCE PRESSURE TO 3000 PSI OR BELOW BEFORE POSITIONING INPUT LEVER.

(1) Use test set up per par. B.

(2) Open ports Ra and Rb to atmosphere.

(3) Gradually increase pressure at ports Pa and Pb to 5400 psi and hold pressure for a minimum of 2 minutes.

(4) Reduce pressure to 1-5 psi. Hold pressure for a minimum of 2 minutes.

(5) (6) (7) Deleted.

(8) Check that there is no external leakage, permanent set, or intersystem leakage.

E. Rig Neutral, Cylinder Stroke and Clearance Test

(1) Turn S-6 to position 3 , apply 3000 psi to pressure ports and place input lever in RIG NEUTRAL position. Check that position of surface indicator is at 0 degrees and that actuator output rig pin fits properly. Check that dimension between actuator bearing centerlines is 27.46-27.54 inches.

CAUTION: AFTER TEST, REMOVE ACTUATOR OUTPUT RIG PIN BEFORE REMOVING INPUT LEVER RIG PIN.

(2) Manually move input lever until actuator output bottoms. Check that actuator moves 25-1/2 to 26-1/2 degrees (1.952- to 1.992-inch linear strokes) in each direction without binding or interference of linear linkage during movement or at stops. Starting with the input lever in the neutral position, move the input lever in the extend direction as fast as necessary to hear the higher flow from the secondary slide action. Actuator snubbing must be visually evident near end of stroke. Repeat in opposite direction. Actuator snubbing must be visually evident near end of stroke.

(3) With no pressure at ports Pa, Pb, Ra and Rb, manually move input lever from one external stop to the other. Input lever must move freely with no binding or excessive friction between stops or at either stop on units overhauled or in service.

F. Linkage Breakout Friction Test

(1) Set S-6 to position 3. Attach a spring scale to the arm at pilot input point. Manually cycle input lever from stop to stop, then position lever at center and hold for 5 seconds maximum. Pull spring parallel to PCU axis and measure force required to start actuator on units overhauled or in service:

(a) Force to start actuator to extend must not exceed 19.0 ounces.

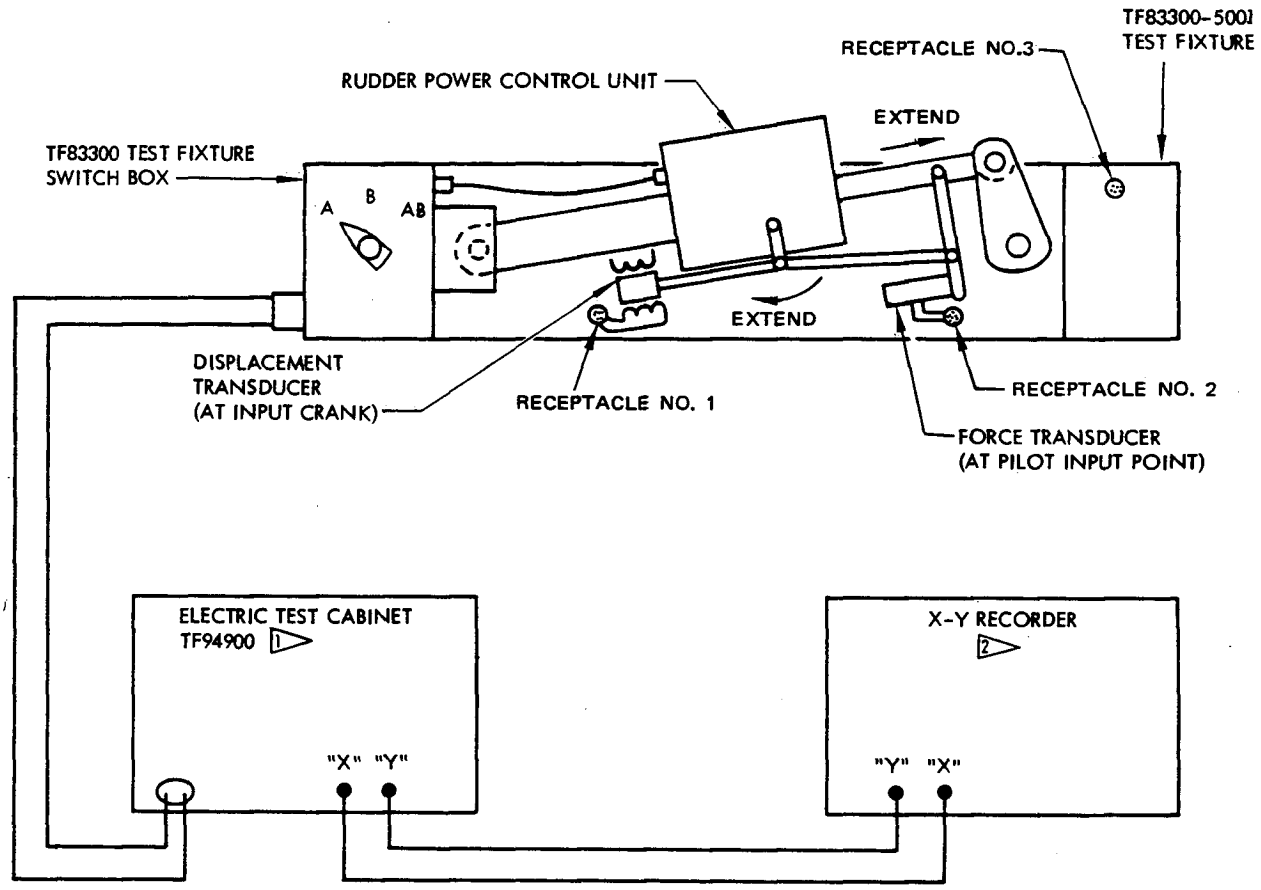
(b) The force maintained in the extend direction to when the actuator starts to retract must not be less than 1.0 ounce.

G. Input Force Versus Input Travel Test

(1) Rig piston rod to zero degree on fixture indicator (RIG NEUTRAL position). Turn S-6 to position 3. Reduce supply pressure to port Pa and Pb to zero psi.

(2) Attach test fixture force transducer to pilot input point on input lever, as shown in Fig. 722. Turn S-7 to position 2.

(3) Connect force transducer output leads to electrical receptacle No. 2 on TF83300-5001 test fixture.



1 a. SIGNAL MODE TO "MANUAL"
b. TS SWITCH AT POSITION 3, THEN POSITION 8
c. X-Y RECORDER SWITCH TO POSITION 2

2 a. "X" - FORCE TRANSDUCER
b. "Y" - INPUT DISPLACEMENT TRANSDUCER

Wiring Schematic for Input Force/Travel Test
Figure 722

(4) Plug X-Y recorder leads into X-Y jacks on back of Electrical Test Cabinet TF94900. With dead weights, adjust X-Y recorder gain to calibrate force transducer output on Y axis of recorder to 10 pounds per inch.

NOTE: Functional relationships for Test Selector Switch/X-Y Switch positions are shown in Fig. 721.

(5) Attach linear displacement transducer and dial indicator to input crank. Connect transducer output leads in to receptacle No. 1 on TF83300-5001 Test Fixture. Refer to Wiring Schematic for Input Force/Input Travel Test, Fig. 722.

(6) Adjust X-Y recorder gain to calibrate displacement transducer on X axis of recorder to 0.050-inch per inch of valve input crank travel.

(7) Remove input rig pin. Apply 3000 psi to ports Pa and Pb.

(8) Turn S-6 to position 8, test fixture selector switch to A (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10) or to B (65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9), S-2 to MANUAL, and SY-2 to EXTEND (8MA input signal to transfer valve).

(9) Manually cycle input lever to external extend stop at least twice before plotting force graph on the X-Y recorder. (See Input force versus Input Travel Limits, Fig. 723.)

(10) Place force transducer in location 90 degrees to the input lever.

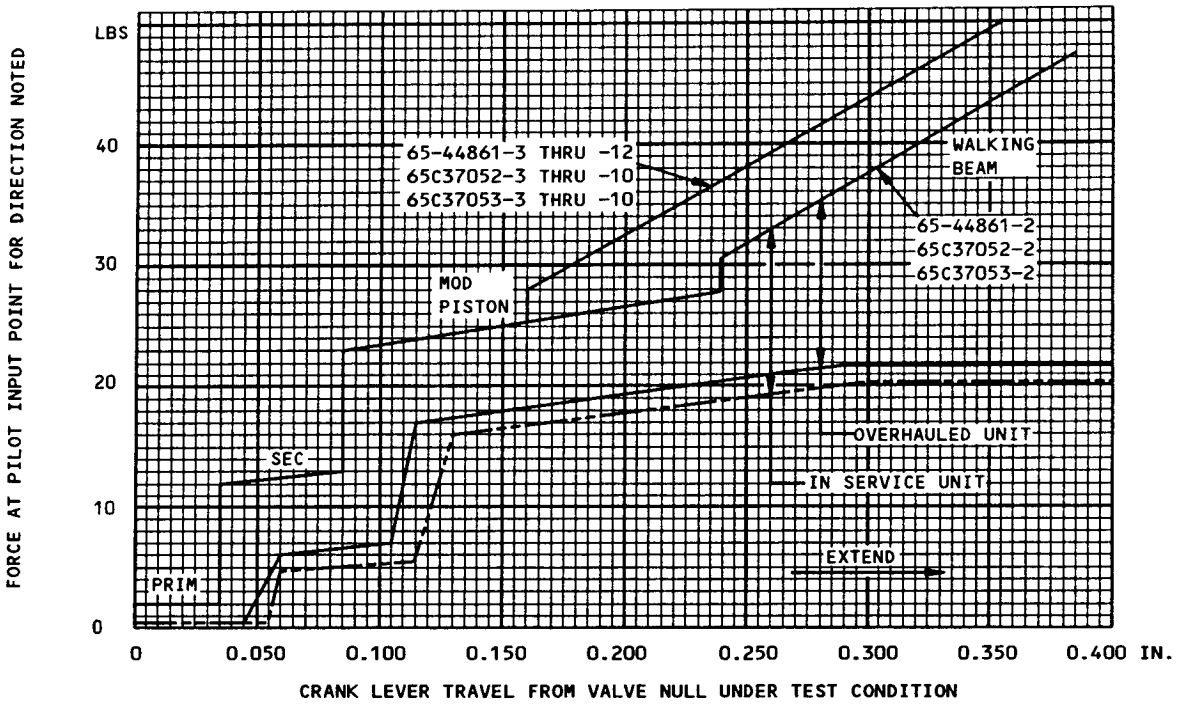
(11) Starting at hydraulic null (actuator piston rod fully extended) and with force transducer maintained at 90 degrees to input lever, gradually push input lever to external extend stop. Record force versus displacement on X-Y recorder (Fig. 723).

(12) Disconnect force transducer from input lever and turn SY-2 to RETRACT (8MA input signal to transfer valve.)

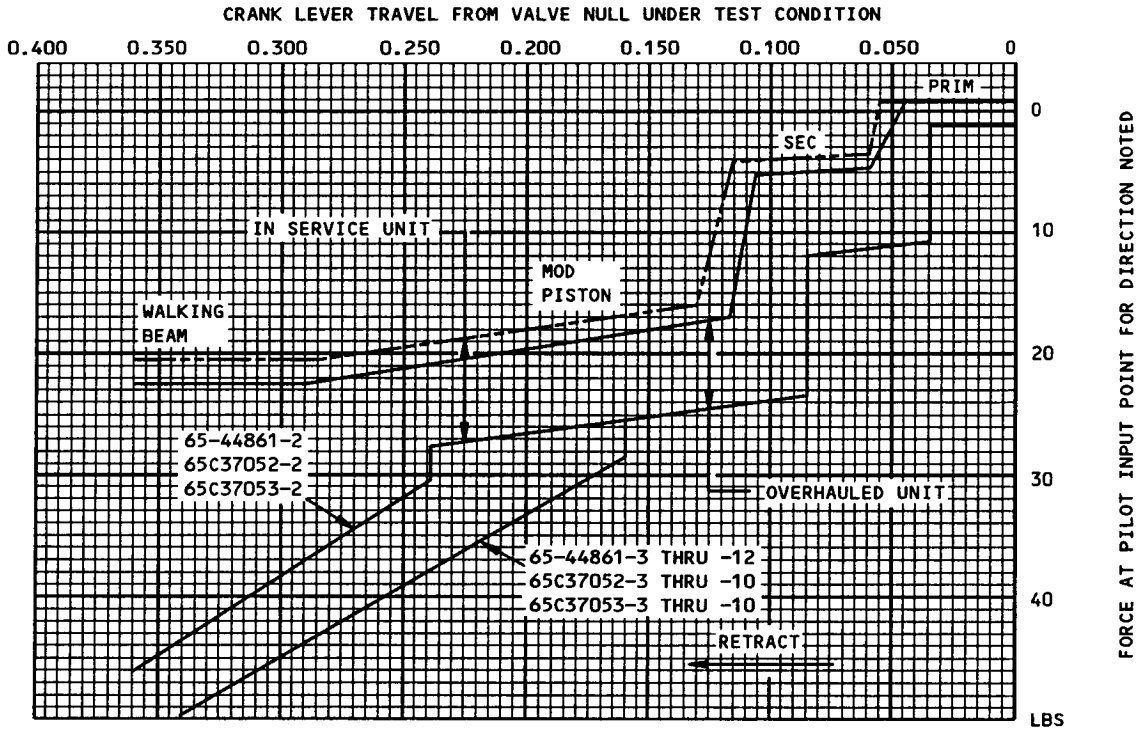
(13) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only), repeat steps (9) (10) (11) except manually cycle input lever to retract stop, and perform tests starting at hydraulic null (actuator piston rod fully retracted). Position transducer at 90 degrees to input lever and gradually push input lever to external retract stop.

(14) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) repeat steps (7) thru (13) except place selector switch at B. Plot new X-Y record.

(15) Plotted force curves must fall within the limits shown in Fig. 723.



INPUT FORCE VERSUS INPUT TRAVEL-EXTEND DIRECTION



INPUT FORCE VERSUS INPUT TRAVEL-RETRACT DIRECTION

Input Force Versus Input Travel
Figure 723

G79037

H. Cylinder Rod Leakage Test

(1) Turn S-6 to position 5. With PCU mounted in TF83300-5001 test fixture, manually cycle actuator 100 full cycles.

NOTE: A cycle is defined as actuator piston travel from rig neutral to extended to retracted and return to rig neutral.

(2) Measure leakage at each rod gland, at center gland, and at the input lever shaft seal during the 100 cycles.

(a) Leakage at each rod gland must not exceed the following:

1) One drop per 25 cycles for overhauled unit.

2) One drop per 5 cycles for unit in service.

(b) Leakage at center gland must not exceed the following:

1) Two drops per 25 cycles for overhauled unit.

2) Two drops per 5 cycles for unit in service.

(c) Leakage at input arm shaft seal must not exceed the following:

1) One drop per 100 cycles for overhauled unit.

2) One drop per 25 cycles for unit in service.

J. Internal Leakage Test

(1) Turn S-6 to position 7 (yaw damper de-energized). Restrain input lever in the RIG NEUTRAL position. Apply 3000 psi to ports Pa and Pb. Wait until flow rate is stabilized, then measure and record leakage at open ports Ra and Rb. Leakage at each return port must not exceed the following:

(a) 300 cc per minute for overhauled unit.

(b) 3000 cc per minute for unit in service.

(2) Remove input lever rig pin and maintain 15-20 pounds force applied at the pilot input point in the extend direction. Wait until flow rate is stabilized, then measure at port Ra. Leakage must be:

(a) 300-700 cc per minute for overhauled unit.

(b) 300-1085 cc per minute for unit in service.

(3) Maintain 15-20 pounds force applied at the pilot input point in the retract direction. Wait until flow rate is stabilized, then measure leakage at port Rb. Leakage must be:

(a) 300-700 cc per minute for overhauled unit.

(b) 300-1085 cc per minute for unit in service.

(4) For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only, turn S-6 to position 6 and the TF83300-5001 test fixture selector switch to AB. Restrain input lever in the rig neutral position. Apply 3000 psi to ports Pa and Pb. Allow flow to stabilize, then measure and record leakage at ports Ra and Rb. Leakage at each port must not exceed the following:

(a) 1370 cc per minute for overhauled unit.

(b) 2000 cc per minute above amount of leakage measured in step (1)(b) at ports Ra, Rb for unit in service.

(5) For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10, turn S-6 to position 8 and the TF83300-5001 test fixture selector switch to AB. Restrain input lever in the rig neutral position. Apply 3000 psi to ports Pa and Pb. Using switch SY-2, command yaw damper to extend and retract positions. At each position, allow flow to stabilize, then measure and record leakage at ports Ra and Rb. Leakage at each port must not exceed the following:

(a) 1370 cc per minute for overhauled unit.

(b) 2000 cc per minute above amount of leakage measured in step (1)(b) at port Ra, Rb for units in service.

(6) For 65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9, turn S-6 to position 6 and TF83300-5001 test fixture selector switch to B. Restrain input lever in the rig neutral position. Apply 3000 psi to ports Pa and Pb. Allow flow to stabilize, then measure and record leakage at port Rb. Leakage must not exceed the following:

(a) 1370 cc per minute for overhauled.

(b) 2000 cc per minute above amount of leakage measured in step (1)(b) at port Rb for units in service.

(7) For 65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9, turn S-6 to position 8 (yaw damper energized) and the TF83300-5001 test fixture selector switch to B. Restrain input lever in the rig neutral position. Apply 3000 psi to ports Pa and Pb. Using switch SY-2 command yaw damper to extend and retract positions. At each position, allow flow to stabilize, then measure and record leakage at port Rb. Leakage must not exceed the following:

(a) 1370 cc per minute for overhauled unit.

(b) 2000 cc per minute above amount of leakage measured in step (1) (b) at port Rb for units in service.

K. Intersystem Leakage Test

CAUTION: REDUCE PRESSURE AT PORT Ra BEFORE REDUCING PRESSURE AT PORT Pa.

(1) Turn S-6 to position 5 and set input lever in the RIG NEUTRAL position. Apply 200 psi to ports Pa and Ra, with ports Pb and Rb open to atmosphere. Measure leakage at ports Pb and Rb. Combined leakage from ports Pb and Rb must not exceed 10 cc per minute.

L. Transducer Output Test

(1) Set up for test as follows:

(a) Set S-6 on cabinet TF94900 to position 4, S-2 to MANUAL and S-3 to TRANSDUCER OUTPUT. For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 set the TF83300-5001 test fixture selector switch to A. For 65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9, set selector switch to B.

(b) Set input lever in the RIG NEUTRAL position with hydraulic power applied.

(c) Connect a vacuum tube voltmeter (Hewlett-Packard Model 400D, or equivalent) to the System A (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10) or System B (65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9) TRANSDUCER OUTPUT jacks. Use 0- to 10-volt scale on voltmeter.

(2) Turn SY-2 to fully extend and fully retract yaw damper actuator. Read and record transducer output voltage at both positions.

(3) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Move test fixture selector switch to B. Connect VTVM to System B TRANSDUCER OUTPUT and repeat step (2).

(4) Reading on VTVM in each direction must be:

(a) 4.2-4.8 volts ac for 65-44861-2, 65C37052-2, 65C37053-2 (Systems A and B)

(b) 1.95-2.55 volts ac for 65-44861-3, -4, -10, 65C37052-3,-4,-10, 65C37053-3, -4, -10 that use aluminum end cap (2, Fig. 1110, P/N 59174-1, -3) (Systems A and B)

3.07 to 3.67 volts ac for 65-44861-3, -4, -10, 65C37052-3, -4, -10, 65C37053-3, -4, -10 that use steel end cap (2, Fig. 1110, P/N 59174-5) (Systems A and B)

(c) 1.95-2.55 volts ac for 65-44861-5, -8, 65C37052-5, -8, 65C37053-5, -8 that use aluminum end cap (2, Fig. 1110, P/N 59174-1,-3) (System B)

3.07 to 3.67 volts ac for 65-44861-5, -8, 65C37052-5, -8, 65C37053-5,-8 that use steel end cap (2, Fig. 1110, P/N 59174-5) (System B)

(d) 3.07-3.67 volts ac for 65-44861-6, -7, -9, -11, -12, 65C37052-6, -7, -9, 65C37053-6, -7, -9 (System B)

M. Transducer Null Voltage Test

(1) Connect VTVM to the System A (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10) or System B (65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9) TRANSDUCER OUTPUT. Use 0- to 0.1-volt scale on voltmeter.

(2) Set input lever in the RIG NEUTRAL position with hydraulic power applied.

(3) Turn test fixture selector switch to A (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10) or System B (65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9) and S-6 to position 5. Read and record transducer output voltage.

(4) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Repeat steps (1), (2), (3) except connect VTVM to the System B TRANSDUCER OUTPUT and turn test fixture selector switch to B.

(5) Null voltage must not exceed the following for any system.

(a) 50 millivolts (0.05 volt) for overhauled unit

(b) 150 millivolts (0.15 volt) for unit in service

N. Yaw Damper Authority Test

(1) Position test fixture dial indicator to actuator rod end, in line with the actuator centerline. Set input lever in RIG NEUTRAL position.

(2) Turn test fixture selector switch to A (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10) or to B (65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9) and S-6 to position 6. Set dial indicator to zero.

(3) Turn S-6 to position 8.

(4) Adjust SY-2 to obtain maximum extend and retract position of yaw damper. Measure and record actuator output stroke in both directions. The measured stroke in each direction from neutral must be within the limits shown in Fig. 723A.

(5) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Repeat steps (1) thru (4), except set test fixture selector switch to B and System B switch IN PHASE.

(6) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Repeat steps (1) thru (4), except turn test fixture switch to AB and system B switch to IN PHASE.

(7) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Turn S-6 to position 6 and system selector switch to A. Set dial indicator to zero. Turn the test fixture selector switch to AB. Set switch on test fixture to SYSTEM B OUT OF PHASE and turn S-6 to position 8.

(8) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Turn SY-2 to EXTEND (System A extend and System B retract commands). Measure and record actuator piston position. Check that rod end is stable, with no evidence of hunting or oscillation, and is within 0.050 inch of zero.

(9) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Repeat step (10) except turn SY-2 to RETRACT (System A retract and system B extend command). Limits are the same.

OVERHAULED UNIT			
PCU Assembly	Actuator Output Stroke (inches)		
	System A	System B	System AB
65-44861-2 65C37052-2 65C37053-2	0.294 to 0.334	0.294 to 0.334	0.335 to 0.375
65-44861-3,-4 65C37052-3,-4 *[1] 65C37053-3,-4	0.137 to 0.177	0.137 to 0.177	0.294 to 0.334
65-44861-3,-4,-10 65C37052-3,-4,-10 *[2] 65C37053-3,-4,-10	0.216 to 0.256	0.216 to 0.256	0.335 to 0.375
65-44861-5,-8 65C37052-5,-8 *[1] 65C37053-5,-8	------	0.137 to 0.177	------
65-44861-5,-8 65C37052-5,-8 *[2] 65C37053-5,-8	------	0.216 to 0.256	------
65-44861-6,-7,-9,-11,-12 65C37052-6,-7,-9 65C37053-6,-7,-9	------	0.215 to 0.255	------

*[1] For Rudder Power Control Unit assemblies using aluminum end cap (2, Fig. 1110, P/N 59174-1)

*[2] For Rudder Power Control Unit assemblies using aluminum end cap (2, Fig. 1101, P/N 59174-3) or steel end cap (2, Fig. 1110, P/N 59174-5)

Actuator Output Stroke Limits
Figure 723A (Sheet 1)

IN-SERVICE UNIT			
PCU Assembly	Actuator Output Stroke (inches)		
	System A	System B	System AB
65-44861-2 65C37052-2 65C37053-2	0.274 to 0.354	0.274 to 0.354	0.315 to 0.394
65-44861-3,-4 65C37052-3,-4 *[1] 65C37053-3,-4	0.117 to 0.197	0.117 to 0.197	0.274 to 0.354
65-44861-3,-4,-10 65C37052-3,-4,-10 *[2] 65C37053-3,-4,-10	0.196 to 0.276	0.196 to 0.276	0.315 to 0.394
65-44861-5,-8 65C37052-5,-8 *[1] 65C37053-5,-8	------	0.117 to 0.197	------
65-44861-5,-8 65C37052-5,-8 *[2] 65C37053-5,-8	------	0.196 to 0.276	------
65-44861-6,-7,-9,-11,-12 65C37052-6,-7,-9 65C37053-6,-7,-9	------	0.196 to 0.276	------

*[1] For Rudder Power Control Unit assemblies using aluminum end cap (2, Fig. 1110, P/N 59174-1)

*[2] For Rudder Power Control Unit assemblies using aluminum end cap (2, Fig. 1110, P/N 59174-3) or steel end cap (2, Fig. 1110, P/N 59174-5)

Actuator Output Stroke Limits
Figure 723A (Sheet 2)

P. Manual Hysteresis Test

(1) Place one dial indicator on TF83300-5001 test fixture against input lever and one against piston rod end. Turn S-6 to position 9.

(2) Zero both indicators with input lever rig pin installed.

(3) Remove rig pin.

(4) Manually move input lever a minimum distance of 0.250 inch to EXTEND side of neutral and then back to RIG NEUTRAL without overshoot.

(5) Repeat step (4) in RETRACT direction.

(6) Measure and record difference between the initial and final piston rod end indicator reading. The difference (hysteresis) in reading in each direction must not exceed:

(a) 0.004 inch for overhauled unit.

(b) 0.006 inch for unit in service.

Q. Yaw Damper System Phase Lag Test

(1) Set up for test as follows:

(a) Set input lever in RIG NEUTRAL position.

(b) S-6 to position 10.

(c) Turn X-Y recorder to STANDBY.

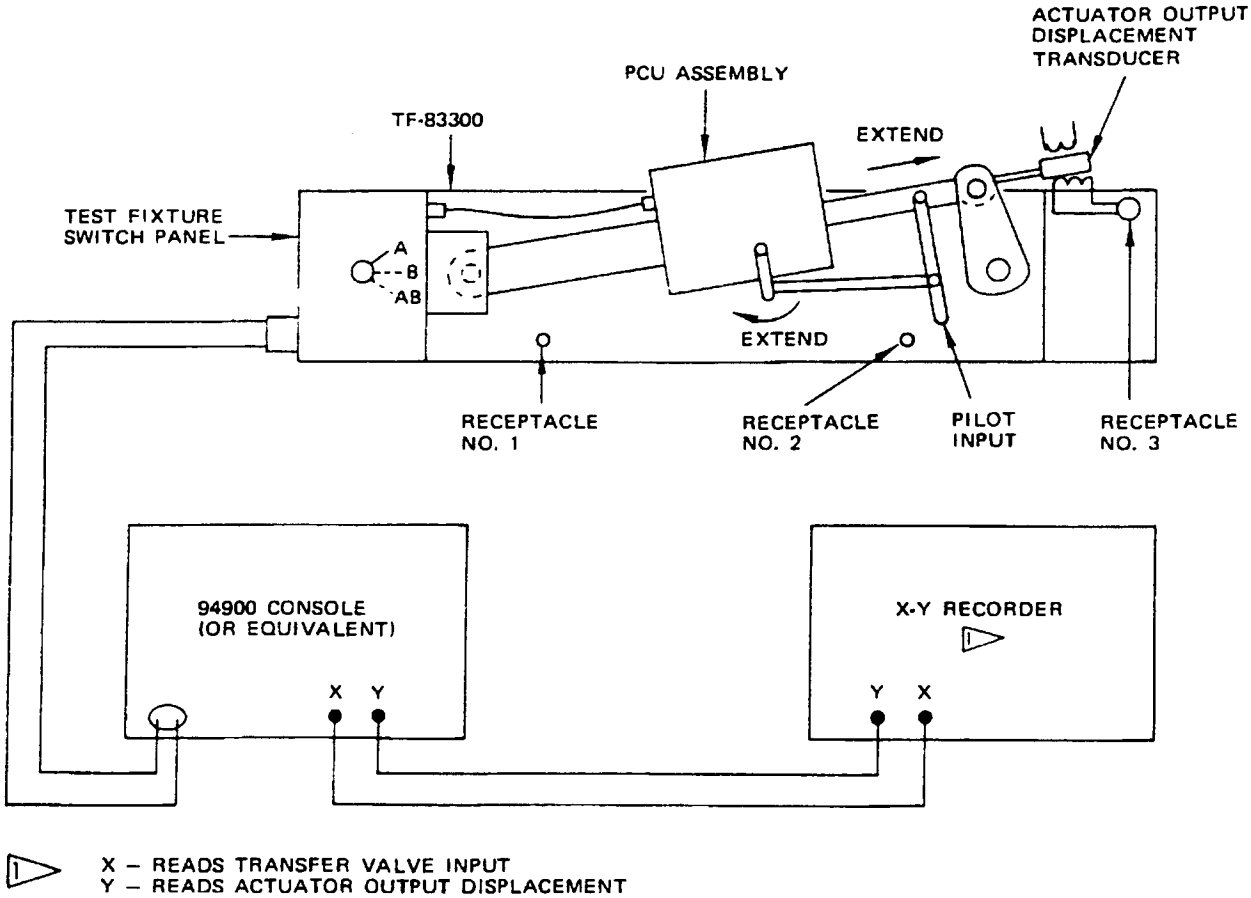
(d) Turn S-7 to position 5.

(e) Position test fixture system selector to A (65-44861-2,-3,-4,-10, 65C37052-2,-3,-4,-10, 65C37053-2,-3,-4,-10) or to B (65-44861-5 thru -9,-11,-12, 65C37052-5,-6,-7,-8,-9, 65C37053-5 thru -9).

(f) Position S-3 to OUTPUT.

(g) Position POSITION TRANSDUCER switch on switch box to OUTPUT.

(h) Connect cable from actuator output transducer to receptacle No.3 (Fig. 724).



Wiring Diagram – Phase Lag Test
Figure 724

G79047

(2) Turn S-2 to CYCLE and adjust cycling rate to 1.0 Hz. With SY-1, adjust cycling amplitude to 0.0144 to 0.0176 inch total actuator output stroke.

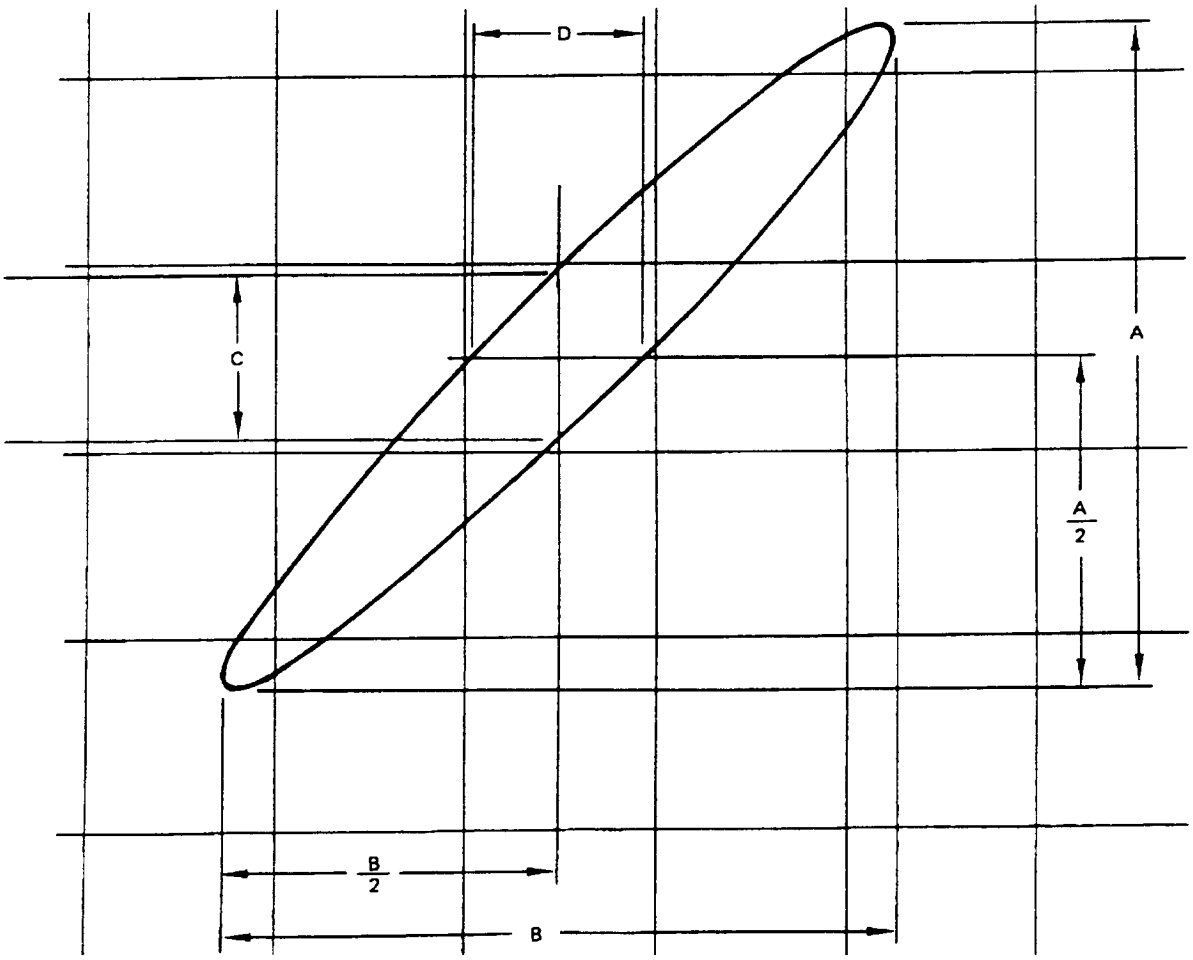
(3) Turn on X-Y recorder, adjust gain controls until phase lag loop is approximately 4.0 inches long on each axis. Record three complete consecutive loops on same graph.

(4) (For 65-44861-2,-3,-4,-10, 65C37052-2,-3,-4,-10, 65C37053-2,-3,-4,-10 only) - Repeat steps (1) thru (3) except with test fixture system selector at B.

(5) Each loop must be reasonably near an ellipse and must not cross over itself at any point. The phase angle calculated for each loop per sample (Fig. 725) must not exceed:

(a) 25 degrees (or sin ϕ, 0.423) for overhauled unit.

(b) 30 degrees (or sin ϕ, 0.500) for unit in service.



$$\text{SINE } \emptyset = \frac{\frac{C}{A} + \frac{D}{B}}{2} = 0.423 \text{ MAX } (25^{\circ})$$

CALCULATION

Phase Lag Check Plot
Figure 725

G79062

R. Yaw Damper System Repeatability and Linearity Test

(1) Use same test setup as in par. Q.(1), (2), (3) phase lag test for system A (65-44861-2,-3,-4,-10, 65C37052-2,-3,-4,-10, 65C37053-2,-3,-4,-10) or system B (65-44861-5 thru -9,-11,-12, 65C37052-5,-6,-7,-8,-9, 65C37053-5 thru -9).

(2) Turn S-2 to CYCLE and adjust cycling rate to 0.10 Hz. With SY-1, adjust cycling amplitude to drive main actuator piston output stroke to a peak-to-peak displacement of 0.050 to 0.060 inch. Adjust X and Y axis gain as required to provide a loop 4.90 to 5.10 inch long on each axis.

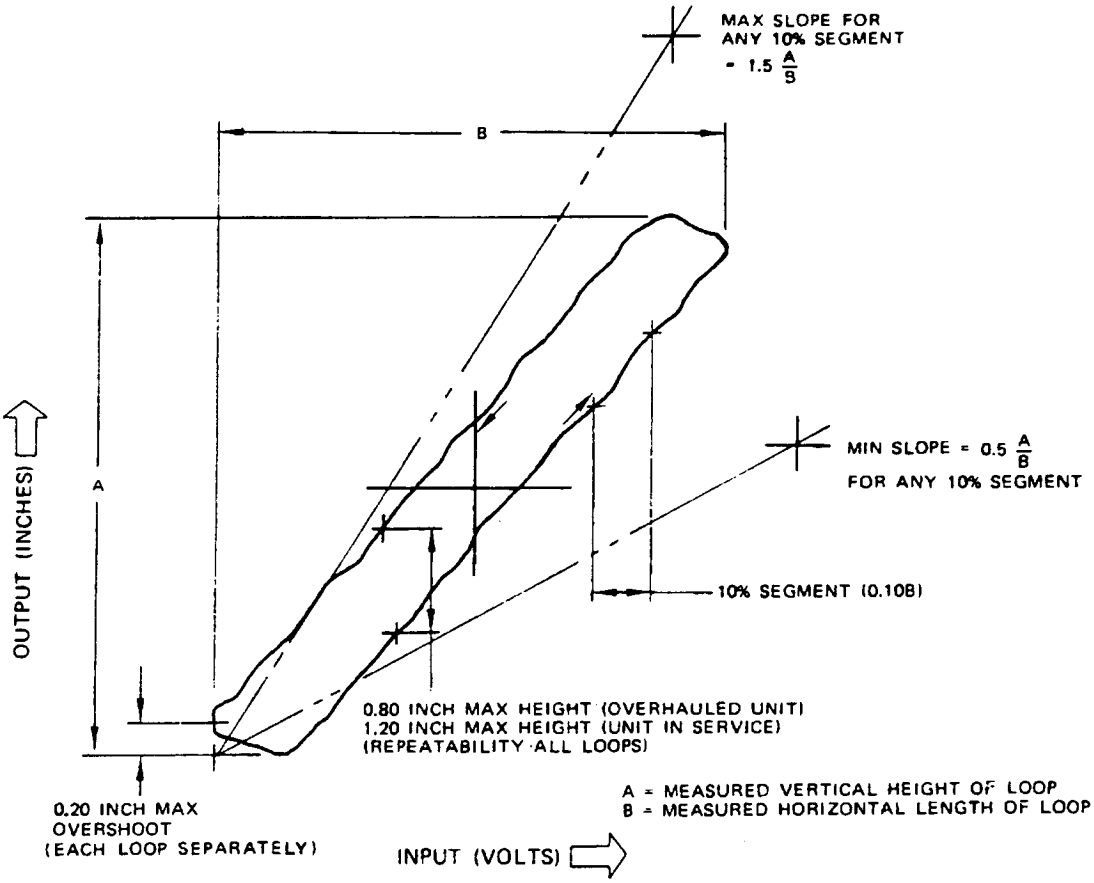
(3) Record X-Y plot of main actuator output position versus input signal voltage. Record three consecutive loops over each other.

(4) For 65-44861-2,-3,-4,-10, 65C37052-2,-3,-4,-10, 65C37053-2,-3,-4,-10 only, repeat steps (1) thru (3) except with test fixture system selector at B.

(5) Maximum total height of combined loops for each yaw damper anywhere within the plot must not exceed: (See Fig. 726)

(a) 0.8 inch (0.008 inch at actuator) for overhauled unit.

(b) 1.2 inch (0.012 inch at actuator) for unit in service.



Repeatability and Linearity Check Plot
Figure 726

G79075

(c) Maximum output displacement after the input voltage has reversed must not exceed 0.2 inch (0.002 inch at actuator), applied to each loop separately.

(d) Average output/input slope over any 10% segment of each loop must be within the slope limits shown. The slope limit applies to each loop separately within the middle 80% of each loop.

S. Phase Test

(1) Set input lever in RIG NEUTRAL position. Turn S-6 to position 10.

(2) Turn TF83300-5001 test fixture selector switch to A (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10) or to B (65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9).

(3) Turn SY-2 clockwise (EXTEND).

(a) Actuator piston rod end must extend, and operation must be a smooth and stable motion.

(4) Turn SY-2 counterclockwise (RETRACT).

(a) Actuator piston rod end must retract, and operation must be a smooth and stable motion.

(5) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Repeat steps (3), (4) with test fixture selector switch at B and system B switch at IN PHASE.

T. Yaw Damper Engage Test

(1) Set input lever in RIG NEUTRAL position. Turn S-6 to position 9.

(2) Turn test fixture selector switch to A (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2,-3,-4,-10) or to B (65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9).

(3) Adjust SY-2 to null transfer valve (zero current) and set actuator output dial indicator to zero.

(4) Turn S-6 to position 10 and measure actuator output movement. Movement of rod must not exceed:

(a) 0.004 inch for overhauled unit

(b) 0.010 inch for unit in service

(5) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Repeat steps (1), (3), (4), except turn test fixture selector switch to B. Limits are the same.

U. Bypass Valve Operation Test

(1) Turn S-6 to position 11.

(2) Position piston rod to approximately midstroke and reduce inlet pressure at ports Pa and Pb to zero psi.

(3) Increase inlet pressure at port Pa from zero to 250 psi differential, (above return pressure).

(4) Move input lever hard over in each direction. Actuator piston must not move.

(5) Repeat steps (1) thru (4) except apply pressure at port Pb. Limits are the same.

(6) Apply sufficient pressure at ports Pa and Pb to position actuator piston at extreme EXTEND stop. Restrain input lever in EXTEND position. Reduce inlet pressure to 250 psi differential (above return pressure). Slowly increase pressure and observe flow at ports Ra and Rb.

(a) Flow must decrease noticeably at less that 460 psi differential pressure (above return pressure). Record differential pressure at point of change in flow at each return port.

(7) Apply sufficient pressure at ports Pa and Pb to position actuator piston at approximately midstroke.

(8) Reduce pressure at ports Pa and Pb to zero psi. Plug ports Ra and Rb. Manually operate actuator piston rod and check that piston rod moves 1.00 inch or more in either direction with no spongy tendency. This test verifies that by-pass valves are in by-pass position.

V. Duty Cycle Test (optional)

NOTE: This test is not required for unit in service unless actuator seals have been replaced.

(1) Turn S-6 to position 10 and set input lever in RIG NEUTRAL position.

(2) Turn test fixture system selector switch to A (65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10) or to B (65-44861-5 thru -9, -11, -12, 65C37052-5, -6, -7, -8, -9, 65C37053-5 thru -9). Turn S-2 to EXT SIG.

(3) Connect function generator to EXT MOD IN (on back of cabinet TF94900). Set generator to produce 0.05 Hz (3 cpm) sine wave and adjust amplitude for plus or minus full yaw damper authority.

4) Cycle power control unit and collect the leakage at each piston rod seal and center gland of actuator.

(5) (For 65-44861-2, -3, -4, -10, 65C37052-2, -3, -4, -10, 65C37053-2, -3, -4, -10 only) - Repeat step (4) with test fixture system selector at system B.

(6) External leakage on any system must not exceed:

(a) 3.0 cc per 8 hours at each piston rod seal and 6.0 cc in 8 hours at center gland for overhauled unit

(b) 1.8 cc per hour at each piston rod seal and 3.6 cc per hour at center gland for unit in service

W. Low Pressure Leakage Test (optional)

NOTE: This test is not required for unit in service unless actuator seals have been replaced.

(1) Disconnect power control unit from electric test cabinet TF94900. Set input lever in RIG NEUTRAL position.

(2) Apply hydraulic pressure of 45 to 55 psi to ports Ra and Rb. Bleed the PCU to remove any entrapped air and then plug pressure ports Pa and Pb.

(3) Hold pressure in unit to check for external leakage.

(a) No external leakage is permitted after an 8-hour wait for overhauled unit.

(b) No external leakage is permitted after a 1-hour wait for unit in service.

NOTE: If Skydrol 7000 test fluid is used, flush completely out of PCU and fill assembly with hydraulic fluid, BMS 3-11. Do not drain. Cap all ports and electrical receptacles.

X. After final testing apply lockwire, sealant and torque stripes per Assembly.

13. For units removed for possible yaw oscillations (fishtailing) characteristics, perform tests per par. 12.E.(3); 12.F.; 12.Q. and 12.R. using limits for units in service. If the unit does not disclose any anomalies, cycle the unit for 15 to 30 minutes and repeat tests.

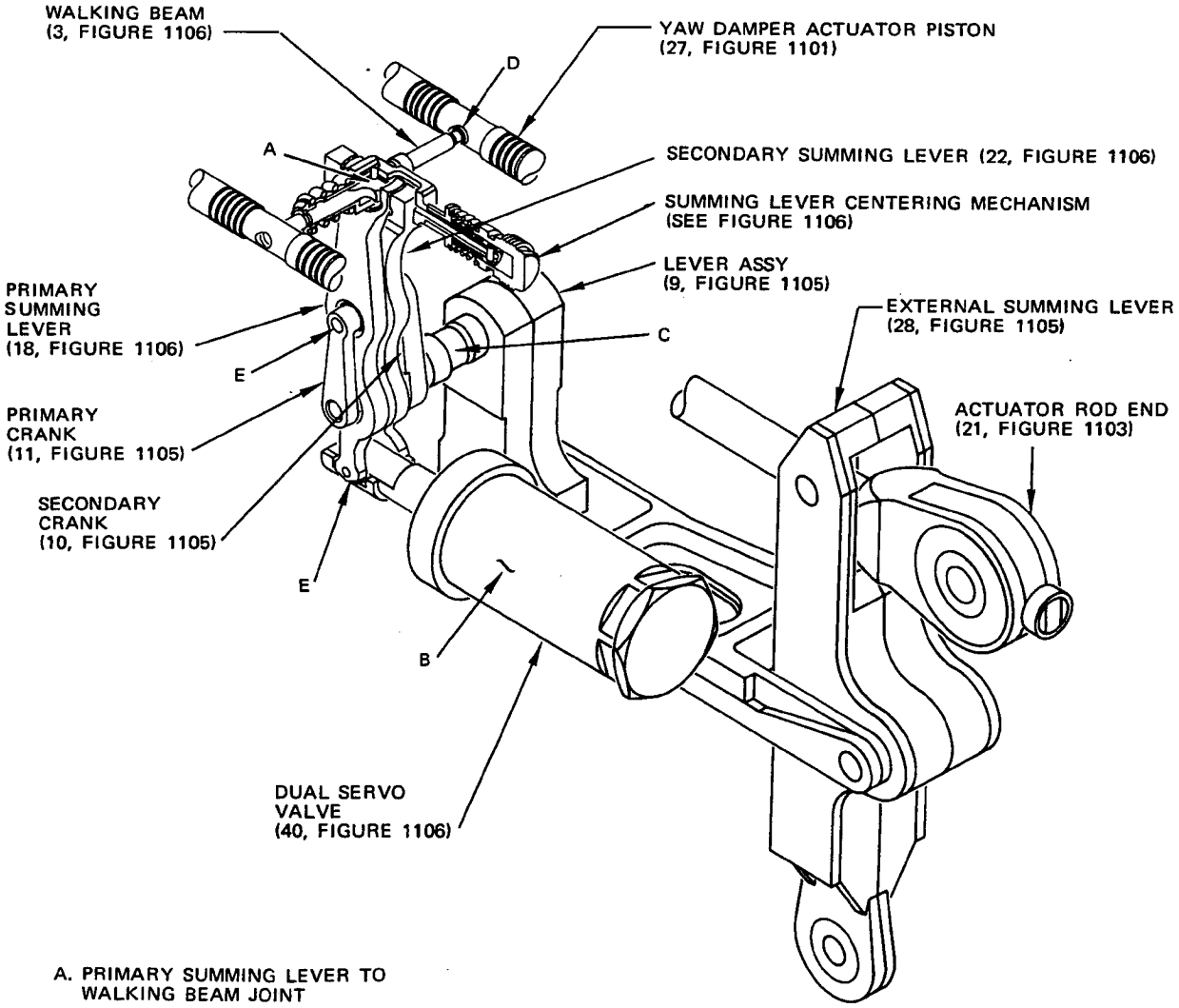
    NOTE: A discrepant PCU may pass the yaw damper test requirements if the unit is not sufficiently warmed up.

    If the unit fails to pass these tests, proceed as follows:

    A. Remove dual servo valve assembly, (40, Fig. 1106) and test for leakage and friction per par. 10.F. and 10.H. respectively, using limits for units in service.

    B. Remove internal and external linkage and examine for evidence of binding or friction (see Fig. 727 for locations of areas where binding or friction is most likely to occur). Lap linkage as required, to eliminate binding or friction. (A burnish mark on the walking beam stems is caused by rubbing on the yaw damper mod piston sleeves, and is not detrimental to performance.)

    C. After lapping and reassembly have been completed, test the PCU assembly per par. 12.A. thru 12.X. using limits for units in service.



A. PRIMARY SUMMING LEVER TO WALKING BEAM JOINT

B. DUAL SERVO VALVE PRIMARY SLIDE

C. LEVER BEARING AND SEAL

D. WALKING BEAM TO YAW DAMPER PISTON SLEEVE JOINT.

E. INTERNAL LINKAGE JOINTS

Limit Cycling - Friction Check Points
Figure 727

TROUBLE SHOOTING

1. Trouble shooting during test of units overhauled or in service, Power Control Unit Assembly, (Fig. 1101) or as noted.

	Trouble	Possible Cause	Correction
A.	Electrical malfunction	Moisture accumulated in receptacle assembly	Examine and correct as necessary.
		High resistance connections, low dielectric strength, wrong connections	Refer to manifold assembly (9), in par. 2.
			Refer to manifold assembly, Fig. 1103, item (54) in par. 9.
			Refer to Valve Assembly (41) in par. 7.
			Test valve (45) in accordance with manufacturers overhaul procedure and replace valve (45) if necessary.
B.	Excessive internal leakage	Defective cylinder assembly buildup (13)	Refer to cylinder assembly buildup, in par. 3.
		Defective actuator assembly (27)	Refer to actuator assembly, yaw damper, in par. 10.
		Defective valve assembly (41)	Refer to valve assembly hydraulic solenoid, in par. 7.
		Defective valve (45)	Test valve (45) in accordance with manufacturers overhaul procedure and replace valve (45) if necessary.
		Improper assembly of Dual Servo Valve retainer (7, Fig. 1108). (Applicable to dual servo valve assemblies 68010-5003,-5005,-5007 only)	Refer to Aft Manifold assembly, in assembly section, par. 2.D.(26)(a) 2).

	Trouble	Possible Cause	Correction
B.	Excessive internal leakage (Cont)	Slide (53) or sleeve (52) not properly matched in valve assembly (51)	Check serial numbers of slide (53) and sleeve (52) for proper grouping and correct as necessary.
		Valve assembly Fig. 1106, item (40) worn or damaged	Refer to valve assembly dual servo, in par. 8.
		Poppet (61) not reacting properly in valve assembly (55)	Repair poppet (61) sealing surface, or replace as necessary.
C.	External leakage	Damaged packing O-ring or seal assembly	Trace source of leak and correct as applicable.
D.	Improper neutral rig	Damaged crank, link and summing lever assemblies (72, 72A, 72B) or manifold buildup (73)	Refer to crank, link and summing lever assemblies (72, 72A, 72B) in par. 5.
			Refer to manifold buildup (73), in par. 6.
E.	Excessive input friction	Components of crank, link and summing lever assemblies (72, 72A, 72B) or in manifold buildup (73) binding	Refer to crank, link and summing lever assemblies (72, 72A, 72B), in par. 5.
			Refer to manifold buildup (73), in par. 6.
		Foreign material in valve assembly, Fig. 1106, item (40)	Refer to valve assembly dual servo Fig. 1106, item (40), in par. 8.
F.	Excessive mechanical hystereris	Excessive play in external or internal linkage joints of crank, link and summing lever assemblies (72, 72A, 72B) or manifold buildup (73)	Refer to crank, link and summing lever assemblies (72, 72A, 72B), par. 5, and manifold buildup (73), par. 6.
G.	Transducer output or null position malfunction	Transducer core, Fig. 1110, item 13, improperly set	Refer to actuator assembly, yaw damper, in par. 10.

	Trouble	Possible Cause	Correction
H.	Improper yaw damper override velocity or stroke authority	Inadequate or excessive stroke in yaw damper actuator assembly (27)	Refer to actuator assembly, yaw damper, in par. 10.
		Flow through valve (45) restricted	Examine filter element (37) for cleanliness, clean as required or replace filter element (37).
			Test valve (45) in accordance with applicable section of manufacturer's overhaul procedure and replace if necessary.
I.	Yaw damper repeatability out of limits or yaw oscillations (fishtailing)	Excessive friction in valve assembly, Fig. 1106, item (40)	Refer to par. 8, dual servo valve assembly.
		Excessive friction in valve linkage	Lap linkage as necessary to reduce friction.
		Worn valve (45)	Test valve (45) in accordance with manufacturer's overhaul procedure and replace valve assembly (45) if necessary.
J.	Excessive phase lag	Worn valve (45)	Test valve (45) in accordance with manufacturer's overhaul procedure and replace valve assembly (45) if necessary.
		Excessive play in crank, link and summing lever assemblies (72, 72A, 72B) or in manifold buildup (73)	Refer to crank, link and summing lever assemblies (72, 72A, 72B), in par. 5, and manifold buildup (73), in par. 6.
K.	Improper yaw damper override force	Defective parts in walking beam assembly, Fig. 1106, item 3	Refer to manifold buildup (73), in par. 6.
L.	Improper snubbing action	Defective actuator cylinder assembly buildup (13)	Refer to cylinder assembly buildup, par. 3.
M.	Motion of unit during test 12.B.(1)	Improper assembly of Dual Servo Valve retainer (7, Fig. 1108). (Applicable to Dual Servo Valve Assemblies 68010-5003, -5005, -5007 only)	Refer to Aft Manifold assembly, in assembly section, par. 2.D.(26)(a)2).

N.	Unsatisfactory secondary slide displacement during test 11.E.(5).	Cracks in the secondary slide (13, Fig. 1108)	Perform dye penetrant inspection/check par. 9.B.(3) or replace secondary slide. Return defective slide to manufacturer if cracks are found.

2. Trouble during test after overhaul, Auxiliary Manifold Assembly (Fig. 1102).

	Trouble	Possible Cause	Correction
A.	High resistance connections	Imperfect crimp connections between wiring (9) and pins (3 or 8)	Repair or replace pins (3 or 8) as required
B.	Low dielectric strength	Defective tubing (10) or improper crimping on pins (8)	Replace tubing (10), repair crimping on pins (8) or replace pins (8)
C.	Wrong connections	Wires (9) connected to wrong pins (3 or 8)	Connect wiring in accordance with figure 403
D.	Leakage at passage sealing plug	Loose plugs (12 or 14)	Replace plugs (12 or 14) and pins (11 or 13)

3. Trouble during test after overhaul for Cylinder Assembly Buildup (Fig. 1103)

	Trouble	Possible Cause	Correction
A.	Improper stroke	Pistons (14 or 34) binding in bearings	Examine pistons (14 or 34) for straightness and concentricity
			Check diameters of bearings (10, 30 and 39) for concentricity
		Rod end assembly (21) not bottomed	Tighten rod assembly (21) to proper torque range
B.	External leakage	Damaged O-ring packings (9, 11, 29 or 31)	Replace O-ring packings (9, 11, 29 or 31)
		Damaged seal (8 or 28)	Replace seal (8 or 28)
C.	Excessive internal leakage	Damaged seal assembly (15 or 35)	Replace seal assembly (15 or 35)
		Damaged packing O-rings (43) or rings (42)	Replace packing O-rings (43) and rings (42)
D.	Improper snubbing	Snubbing rings (13 or 33) improperly installed	Check installation of snubbing rings (13 and 33) in accordance with the assembly instructions and Fig. 504.

E.	Audible clicking or striking sound as piston is moved from full-travel position	Hydraulic lock causing slight movement of center bearing (39)	Modify center bearing (39) per Repair par.1.D.

4. Trouble shooting during test after overhaul for Forward Manifold Assembly (Fig. 1104)

	Trouble	Possible Cause	Correction
A.	Leakage from permanent passage plugs	Plugs (2, 2A) and pins (1, 1A) loose	Replace plugs (2, 2A) and pins (1, 1A)

5. Trouble during test after overhaul, Crank, Link, and Summing Lever Assemblies (72, 72A, 72B, Fig. 1101) (Fig. 1105)

	Trouble	Possible Cause	Correction
A.	Excessive play in linkage	Wear in bearings (5, 12, 26, 30, or 31)	Replace bearings (5, 12, 26, 30, or 31)
B.	Improper neutral rig	Damaged lever assembly (15)	Replace crank assembly (9)
		Damage subassembly (34)	Replace subassembly (34)
		Damaged link assembly (41)	Replace link assembly (41)
C.	Excessive friction	Binding in bearings (5, 12, 26, 30 or 31)	Replace bearings (5, 12, 26, 30 or 31)

6. Trouble during test after overhaul for Aft Manifold Buildup (73, Fig. 1101) (Fig. 1106)

	Trouble	Possible Cause	Correction
A.	Excessive play in internal linkage	Wear in lever assemblies (18) or (22)	Replace lever assemblies (18) or (22) as necessary
		Wear in bearings (19, 23, 27, or 31)	Replace bearings (19, 23, 27, or 31) as necessary
B.	Binding or friction of internal linkage	Bearings (19, 22, 27, or 31) binding	Replace bearings (19, 22, 27, or 31) as necessary
		Friction between summing lever (18) to walking beam (3) ball joint	Lap linkage as necessary to reduce friction
		Interference between secondary summing lever assembly (22) and inside of aft manifold	Grind rivet (24) per Fig. 404

	Trouble	Possible Cause	Correction
C.	Improper yaw damper override force	Spring (6) defective	Replace Walking Beam Assembly (3)
		Segment (10) worn	Replace Walking Beam Assembly (3)

7. Deleted

8. Trouble during test after overhaul for Dual Servo Valve Assembly (Fig. 1108)

	Trouble	Possible Cause	Correction
A.	External leakage	Damage packing O-ring (2)	Replace packing O-ring (2).
B.	Neutral pressure or flow, lap leakage, pressure gain, flow gain. Improper pressure balance or phasing. Friction malfunction	Inserts (13, 15) and slide (14) intermixed. (Applicable to dual servo valve assemblies 68010-5003, -5005, -5007 only)	Check inserts (13, 15) and slide (14) for proper serial number grouping.
		Slides (13, 14) and body assembly (15) intermixed. (Applicable to dual servo valve assemblies 398310-1001, -1003)	Check secondary slide (13), primary slide (14) and body assembly (15) for proper serial number grouping.
		Damaged or worn lap assembly (12)	Return unit to manufacturer for replacement of lap assembly (12).
		Foreign material in lap assembly (12)	For valve assemblies 68010-5003, -5005, -5007: Clean slide (14) and insert assemblies (13, 15).
			For valve assemblies 398310-1001, -1003: Clean slides (13, 14) and body assembly (15).
C.	High primary slide friction	Tight fit between primary slide (14) and primary insert (13)/ secondary slide (13).	Return unit to manufacturer for repair.
D.	Excessive internal leakage	Improper assembly of Dual Servo Valve retainer (7, Fig. 1108). (Applicable to dual servo valve assemblies 68010-5003, -5005, -5007 only)	Refer to Aft Manifold assembly, in assembly section, par. 2.D.(26)(a)2).
E.	Improper cylinder pressures	Improper assembly of Dual Servo Valve retainer (7, Fig. 1108). (Applicable to dual servo valve assemblies 68010-5003, -5005, -5007 only)	Refer to Aft Manifold assembly, in assembly section, par. 2.D.(26)(a)2).

9. Trouble shooting during test after overhaul for Aft Manifold Assembly (Fig. 1109).

	Trouble	Possible Cause	Correction
A.	High resistance connections	Imperfect crimps connection between wiring (9) and pins (3 or 8)	Repair or replace pins (3 or 8) as required.
B.	Low dielectric strength	Defective tubing (10) or improper crimping at pins (8)	Replace tubing (10), repair crimping or replace pins (8).
C.	Wrong connections	Wires (9) connected to wrong pins (3 or 8)	Connect wiring in accordance with Fig. 403.
D.	Leakage at passage sealing plug	Loose plugs (12, 14 or 16)	Replace plugs (12, 14 or 16) and pins (11, 13 or 15).

10. Trouble during test after overhaul for Yaw Damper Actuator Assembly (Fig. 1110)

	Trouble	Possible Cause	Correction
A.	Excessive leakage or friction	Piston (18) or sleeve (19) of lap assembly (17) intermixed with parts of another lap assembly	Check piston (18) and sleeve (19) for proper serial number grouping
		Piston (18) or sleeve (19) damaged (17)	Replace lap assembly
B.	Improper null position	Core (13) improperly set	Set core (13) in accordance with Fig. 502
C.	Inadequate or excessive stroke in yaw damper actuator assembly 27	Diaphragm (10) improperly set	Set diaphragm (10) in accordance with assembly procedure par. 2.E.(1)(e)

11. Trouble during test after overhaul, Cover Assembly (Fig. 1102A).

	Trouble	Possible Cause	Correction
A.	High resistance connections	Imperfect crimp connections between wiring (15, 16) and pin (12)	Repair or replace pin (12) as required
B.	Low dielectric strength	Defective sleeving (14)	Replace sleeving (14)
C.	Wiring connections	Wires (15,16) connected to wrong receptacle (9,10) or plug (11)	Connect wiring in accordance with Fig. 403A

STORAGE INSTRUCTIONS

1. After tests have been completed proceed as follows:

   A. If Skydrol 7000 was used for testing, drain Rudder Power Control Unit Assembly thoroughly.

   B. Partially fill Rudder Power Control Unit Assembly with hydraulic fluid, BMS 3-11.

   C. Plug electrical connectors using plastic caps.

   D. Plug ports with suitable hydraulic fluid resistant plugs and gaskets.

   E. Tag or mark with test date.

   F. Package Rudder Power Control Unit Assembly in a heavy gauge plastic bag.

   G. If stored for a long period of time place Rudder Power Control Unit Assembly, packaged in plastic bag, in a cushioned container or wooden box.

   H. Seal container and mark with assembly part number, serial number, and test date on container exterior.

   J. For further information, refer to Temporary Protective Coatings in Section 20-44-02.

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

NOTE: Equivalent tools, fixtures, and equipment may be used.

Part Number	Nomenclature	Use
1. Rudder Power Control Unit		
A. AF83301-5001	Assembly Fixture ▷1◁	Holds power control unit.
B. TF83300-5001	Test Fixture Assembly ▷1◁	A mounting support and instrumentation to measure operation performance.
C. TF94900-1001, -1005, -1009	Electrical Console Assembly 110 volts 60 Hz single-phase (Alternate to 220V console) ▷1◁	Provides electrical controls and instrumentation.
D. TF94900-1003, -1007, -1011	Electrical Console Assembly 220 volts 50 Hz single-phase ▷1◁	
E. 94991-111	Patch Plug (accessory to TF94900 Console Assembly) ▷1◁	Adapts console for use on 65-44861-2 PCU.
F. 94994-101	Cable Assembly (accessory to TF94900 Console Assembly) ▷1◁	Provides connection between console, TF94900 and Test Fixture TF-83300.
G. 94997-101	Cable Assembly (accessory to TF 94900 Console Assembly) ▷1◁	Provides connection between console TF94900 and Power Control Unit
H. Model 260	Multimeter Simpson Electric Co. 5200 W. Kinzie St. Chicago, Illinois 60644	Measures electrical resistances.
J. Model 400D	VTVM (Vacuum-tube voltmeter) Hewlett Packard Co. 1501 Page Mill Road Palo Alto, California 94304	Measures electrical signals.
K. Model 404	Hypot (High potential tester) Associated Research, Inc. 3758 W. Belmont Ave. Chicago, Illinois 60618	For dielectric strength tests.

Equipment Part Number	Equipment Nomenclature	Use
L. HP7090A	X-Y Recorder Hewlett Packard Co. 1501 Page Mill Road Palo Alto, California 94304	Plots performance characteristics of the control package.
M. DELETED		
N. ---	Check Valve (two required) set to crack at 100 psi at return ports	Simulates airplane hydraulic system conditions.
O. Model 412A	Megger Test Set Hewlett Packard Co. 1501 Page Hill Road Palo Alto, California 94304	For insulation resistance tests.
NOTE: The Hewlett Packard Model 412A megger test set is not available for order. An equivalent substitute, the QuadTech 1863, is available for order and can also be used.		
QuadTech 1863	QuadTech, Inc. 100 Nickerson Road Marlborough, Massachusetts, USA 01752 www/quadtechinc.com	For insulation resistance tests.
P. TF83300-1007 or equivalent	Test Fixture Assembly	Mounts to TF83300-5001 and provides interface to 68010 Dual Servo Valve for top assembly secondary pressure gain test.
Q. 381510TF3	Displacement Test Fixture, 737 Rudder PCU 1	Dual Servo Valve Assembly Secondary Slide Displacement Test
R. 38150TF50	Electronic Box Assembly, 737 Rudder MCV 1	Dual Servo Valve Assembly Secondary Slide Displacement Test
S. 38150TF60	Cable Assembly, 737 Rudder MCV 1	Dual Servo Valve Assembly Secondary Slide Displacement Test

2. Manifold Buildup (Fig. 1106)

A. AT68053-1001	Assembly Tool	For installation of servo valve nut.
B. AT83343	Stop Assembly Tool	Aids installation of stop
C. AT59140	Retainer Assembly Tool	Aids installation of electrical plug retainers.

K29453

3. Yaw Damper Actuator Assembly (27, Fig. 1101)

A.	AT59138	Collet Retracting Tool	Relieves spring pressure for installation of split rings.
B.	TF59196-105	Setting Gage	Gages transducer probe setting.
C.	AT59196-5	Holding Tool	Holds piston while transducer core is adjusted.
D.	AT59196-3	Torque Tool [1]	For adjusting transducer core.
E.	TF-83309-5001	Test Fixture Assembly [1]	Provides mounting support and instrumentation to measure operation performance.

4. Cylinder Assembly Buildup (13, Fig. 1101)

A.	AT83335-1001	Rod End Assembly Tool [1]	Holds parts for application of high torque to actuator rod end.
B.	AT83340-1001	Nut Assembly Tool [1]	Removal and installation of actuator nuts.
C.	AT83333-1001	Seal Insertion Tool [1]	Aids in installing channel seals in actuator bearings.
D.	AT83337-1001	Snubbing Ring Clamp [1]	Aids in installing snubbing rings.
E.	TF83364-1001	Test Fixture Assembly [1]	Provides mounting support and instrumentation to measure operation performance.
F.	SF60600	Switch Box [1]	Provides switching to oscilloscope.
G.	130A	Oscilloscope Hewlett Packard Co. 1501 Page Mill Road Palo Alto, California 94304	Visually displays actuator velocity decrease during snubbing tests
H.	RST 2184	Roller Staking Tool Rexnord Inc. Mechanical Power Division 8300 Rex Road Pico Rivera, California 90660	Roller swages replacement bushing

Equipment Part Number	Equipment Nomenclature	Use
5. Walking Beam Assembly (3, Fig. 1106)		
A. TF83349-5001	Spring Breakout Force Test Fixture Assembly ▷1◁	Provides support and instrumentation.
B. AT83305-1001	Walking Beam Assembly Tool ▷1◁	Aids assembly of walking beam to servo valve piston.
6. Filter Elements (31, 37, Fig. 1101)		
A. TF59197-105	Test Fixture Assembly ▷1◁	Support vehicle for bubble point test of 1 gallon-per-minute filter element
B. TF59197-107	Test Fixture Assembly ▷1◁	Support vehicle for bubble point test of 6 gallon-per-minute filter element.
7. Bypass Valve Lap Assembly (51, Fig. 1101)		
A. TF68061-1001	Test Fixture Assembly ▷1◁	Supports lap assembly for delivery of hydraulic pressure and flow.
8. Cartridge Insertion Check Valve Assembly (59, Fig. 1101)		
A. TF62000	Check Valve Test Manifold ▷1◁	Supports valve for delivery of hydraulic pressure and flow.
9. Hydraulic Thermostat Valve Assembly (68, Fig. 1101)		
A. TF59830-1001	Test Manifold Assembly ▷1◁	Supports valve for delivery of hydraulic pressure and flow.
B. 8692	Temperature Potentiometer Leeds and Northrup 4901 Stenton Ave. Philadelphia, Pa. 19144 (or equivalent)	Measures fluid temperature to check actuation of valve.

Equipment Part Number	Equipment Nomenclature	Use
10. Transfer Valve (45, Fig. 1101) (Test per manufacturer's overhaul instructions.) The following equipment may also be utilized:		
A. TF59106-1001	Test Manifold Assembly ▷	Supports valve (45) for delivery of hydraulic pressure, flow, and electrical signals.
B. TF61626-5005	Hydraulic and Electrical Console Assembly 117 volt 400 Hz single phase ▷	Provides support, power connection, and instrumentation for checkout of transfer valve (45).
C. Model 202A (or equivalent)	Function Generator Hewlett Packard Co. 1501 Page Mill Road Palo Alto, California 94304 (or equivalent)	Supplies shaped input signal for actuating transfer valve.
D. HP7090A	X-Y Recorder Hewlett Packard Co. 1501 Page Mill Road Palo Alto, California 94304	Plots performance characteristics of transfer valve.
E. DELETED		
11. Hydraulic Solenoid Control Valve Assembly (41, Fig. 1101)		
A. TF59600-1001	Test Fixture Assembly ▷	Supports valve for delivery of hydraulic pressure and electrical power.
B. ---	Variable DC Voltage Power Supply, 0 to 28 volt range	Energizes solenoid valve to functional test requirements.

Equipment Part Number	Equipment Nomenclature	Use
12. Dual Servo Valve Assembly (40, Fig. 1106)		
A. TF83310-5003	Test Fixture Assembly	Supports valve for delivery of hydraulic pressure and instrumentation for checkout of the valve.
B. 77300-5003	X-Y Flow Console	Provides instrumentation to measure the valve useful flow in terms of electrical signals for X-Y recorder operation.
C. 68021AT2	Servo Retainer Assembly Tool	Aids disassembly and assembly of servo valves 68010-5003, -5005, -5007.
NOTE: 68021AT2 supersedes AT83341-1001. AT83341-1001 and tools manufactured as equivalent to AT83341-1001 are obsolete.		
D. 398310-AT4	Servo Pin Assembly Tool	Aids disassembly and assembly of servo valves 398310-1001, -1003.
13. Linear Position Transducer (1, Fig. 1110)		
A. TF59196-1001	Test Fixture Assembly	Provides support, power connection and instrumentation for checkout of linear position transducer.
B. Model N1-3 The Singer Co. Metrics Division Gertsch Dept. 3211 South La Cienga Blvd. Los Angeles, Calif. 90016	Null Indicator	Indicates null for transducer tests.
C. Model RT-60 The Singer Co. Metrics Division Gertsch Dept. 3211 South La Cienga Blvd. Los Angeles, Calif. 90016	Ratio Transformer	Aids in determining transducer voltage gain.

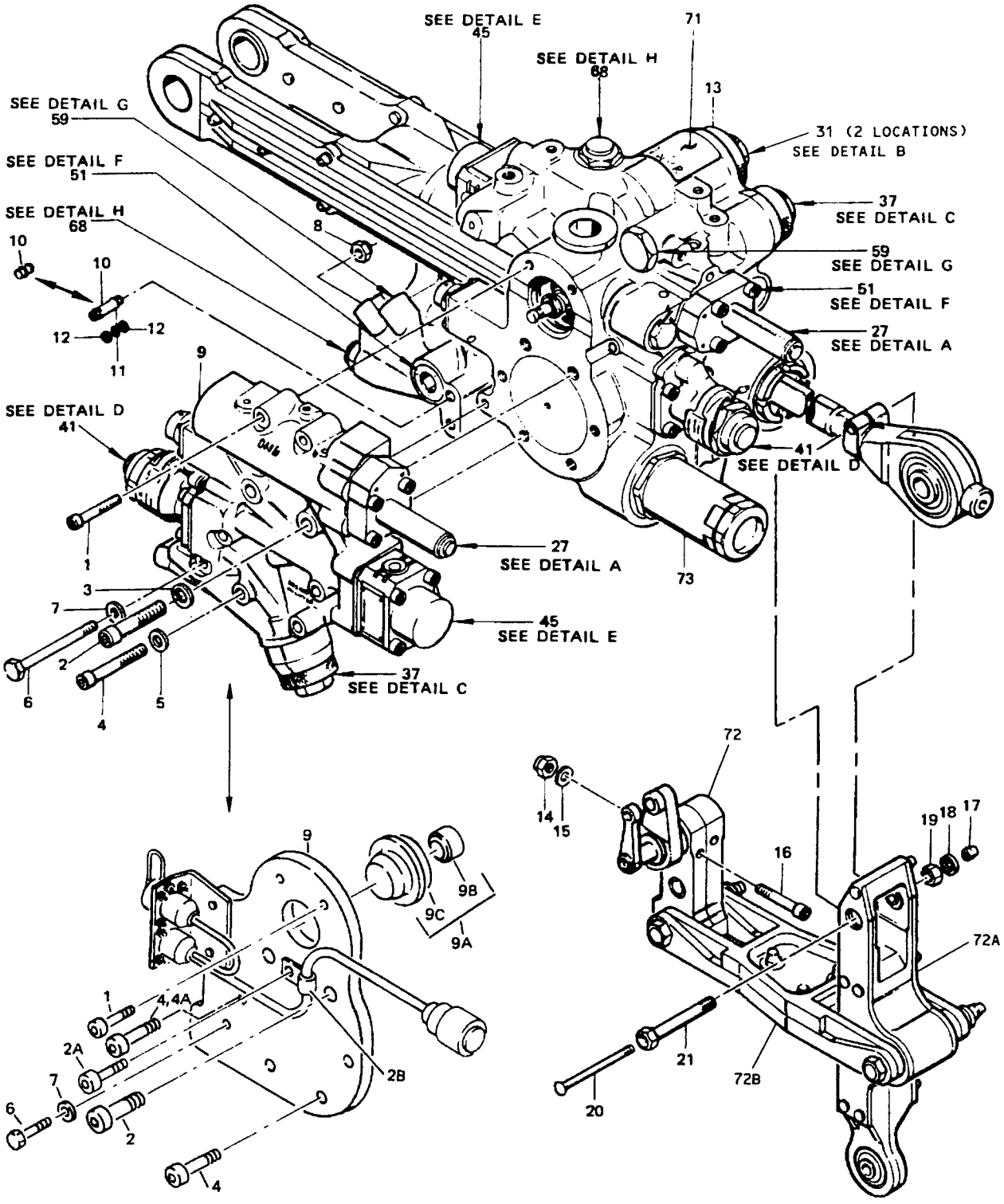
Equipment Part Number	Equipment Nomenclature	Use
D. Model 130A (or equivalent)	Oscilloscope Hewlett Packard Co. 1501 Page Mill Road Palo Alto, California 94304 (or equivalent)	Aids in determining transducer output phase.
E. Model 400D (or equivalent)	VTVM (Vacuum-tube voltmeter) Hewlett Packard Co. 1501 Page Mill Road Palo Alto, California 94304 (or equivalent)	Measures transducer null voltage.
F. 200CD	Signal Generator Hewlett Packard Co. 1501 Page Mill Road Palo Alto, California 94304	Provides input voltage at required frequency during test.
G. MC30	Amplifier McIntosh Laboratory Inc. 2 Chambers Binghampton New York, N.Y. 13903	Amplifies input to proper voltage for testing.

14. Manifold Subassembly, Cover Assembly (9, Fig. 1101; 54, Fig. 1103)

A.	AT59140	Assembly Tool ▷	Permits installation of plug assembly retainers.
B.	000407-0001	Contact Crimp Tool	Permits connecting and disconnecting wiring assembly without damage to plug assemblies or wiring.
C.	000407-0002	Contact Crimp Gage	
D.	000407-0003	Contact Insertion Tool	
E.	000407-0004	Contact Extraction Tool Viking Industries 21001 Nordhoff Chatsworth, California 91311	
F.	294-88	Contact Insertion Tool	Permits connecting and disconnecting wiring to receptacle assembly without damage to receptacle assembly or wiring.
G.	294-89	Contact Removal Tool	
H.	294-90	Contact Crimp Tool Amphenol Corp. 2801 S. 25th Ave. Broadway, Illinois 60153	

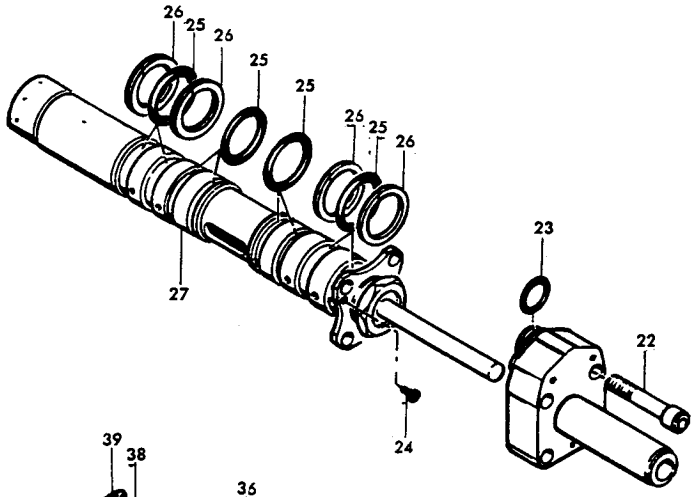
Equipment Part Number	Equipment Nomenclature	Use
J. Model 260	Multimeter Simpson Electric Co. 5200 W. Kinzie St. Chicago 44, Illinois	Measures electrical resistance between pins of receptacle assembly and plug assemblies.
K. Model 404	Hypot (High potential tester) Associated Research, Inc. 3773 W. Belmont Ave. Chicago, Illinois 60618	For dielectric strength test.

| [1] Parker-Hannifin Corp., 18321 Jamboree Blvd., Irvine, California 92713

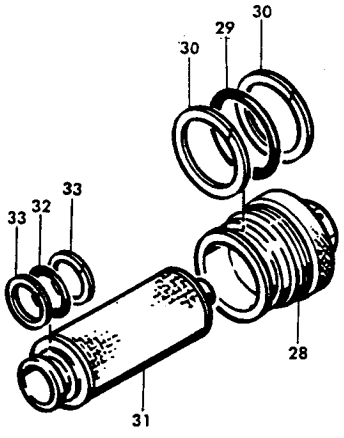


Rudder Power Control Unit Assembly
Figure 1101 (Sheet 1)

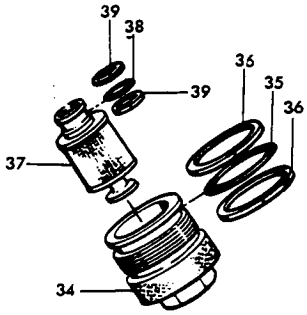
G79041



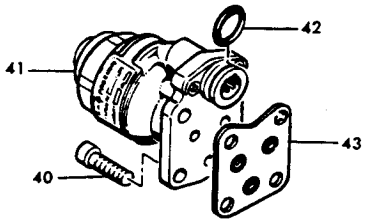
DETAIL A



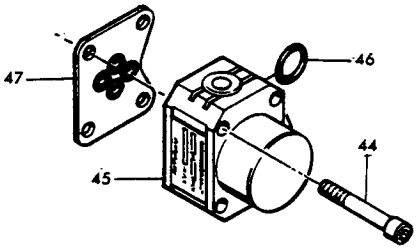
DETAIL B



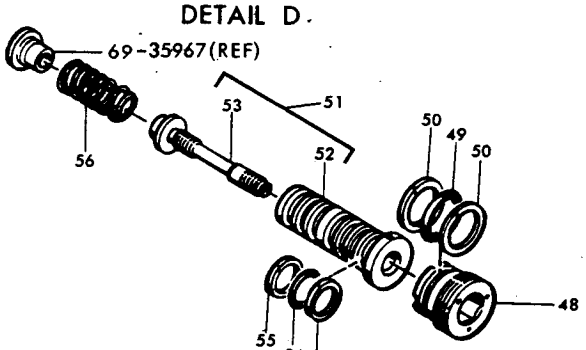
DETAIL C



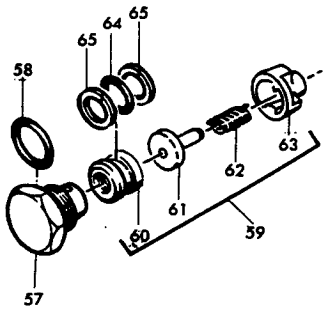
DETAIL D



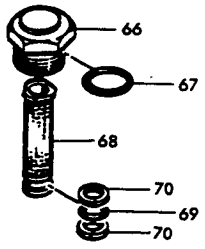
DETAIL E



DETAIL F



DETAIL G



DETAIL H

Rudder Power Control Unit Assembly
Figure 1101 (Sheet 2)

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
	65-44861-2		UNIT ASSY, RUDDER POWER CONTROL (PRE SB 27-1185)(PRE SB 27-1091) (PRE SB 27A1202R2, 27A1202R3)	A	RF
	65-44861-3		UNIT ASSY, RUDDER POWER CONTROL (PRE SB 27-1185)(PRE SB 27-1091) (PRE SB 27A1202R2, 27A1202R3)	B	RF
	65-44861-4		UNIT ASSY, RUDDER POWER CONTROL (PRE SB 27-1185)(PRE SB 27-1091) (PRE SB 27A1202R2, 27A1202R3)	C	RF
	65-44861-5		UNIT ASSY, RUDDER POWER CONTROL (PRE SB 22-1069)(PRE SB 22-1074) (PRE SB 27-1127)(PRE SB 27-1185) (POST SB 27-1091)(PRE SB 27A1202R2, 27A1202R3)	D	RF
	65-44861-6		UNIT ASSY, RUDDER POWER CONTROL (PRE SB 27-1127)(POST SB 22-1074) (POST SB 22-1069)(PRE SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	E	RF
	65-44861-7		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1127)(POST SB 22-1074) (PRE SB 27-1145)(PRE SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	F	RF
	65-44861-8		UNIT ASSY, RUDDER POWER CONTROL (PRE SB 22-1074)(PRE SB 27-1145R1) (POST SB 27-1127)(PRE SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	G	RF
	65-44861-9		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1145 & SB 27-1145R1) (PRE SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	H	RF
	65-44861-10		UNIT ASSY, RUDDER POWER CONTROL (PRE SB 27-1185R1)(PRE SB 27A1202R2, 27A1202R3)	I	RF
	65-44861-11		UNIT ASSY, RUDDER POWER CONTROL (PRE SB 27A1202R2, 27A1202R3)	J	RF
	65-44861-12		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	U	RF
	65C37052-2		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185)(PRE SB 27A1202R2, 27A1202R3)	K	RF
	65C37052-3		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185)(PRE SB 27A1202R2, 27A1202R3)	L	RF
	65C37052-4		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185)(PRE SB 27A1202R2, 27A1202R3)	M	RF

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
	65C37052-5		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185)(PRE SB 27A1202R2, 27A1202R3)	N	RF
	65C37052-6		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185)(PRE SB 27A1202R2, 27A1202R3)	P	RF
	65C37052-7		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185)(PRE SB 27A1202R2, 27A1202R3)	Q	RF
	65C37052-8		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185)(PRE SB 27A1202R2, 27A1202R3)	R	RF
	65C37052-9		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185)(PRE SB 27A1202R2, 27A1202R3)	S	RF
	65C37052-10		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27-1185R1)(PRE SB 27A1202R2, 27A1202R3)	T	RF
	65C37053-2		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	V	RF
	65C37053-3		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	W	RF
	65C37053-4		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	X	RF
	65C37053-5		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	Y	RF
	65C37053-6		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	Z	RF
	65C37053-7		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	BA	RF
	65C37053-8		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	CA	RF
	65C37053-9		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	DA	RF
	65C37053-10		UNIT ASSY, RUDDER POWER CONTROL (POST SB 27A1202R2, 27A1202R3)	EA	RF
1	NAS1351-4H24P		. SCREW	ABCIKL MT V-X EA	2
1	NAS1351-4H10P		. SCREW	D-HJ N-SU Y-DA	2
2	NAS1351-6H28P		. SCREW	ABCIKL MT V-X EA	2
2	NAS1351-6H14P		. SCREW	D-HJ N-SU Y-DA	2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-2A	NAS1351-3H6P		. BOLT	D-HJ N-SU Y-DA	2
2B	NAS1715C4T		. CLAMP	D-HJ N-SU Y-DA	2
3	AN960PD616		. WASHER	ABCIKLM T V-X EA	2
4	NAS1351-5H32P		. SCREW	ABCIKLM T V-X EA	4
4	NAS1351-5H12P		. SCREW	DENPYZ	4
4	NAS1351-5H12P		. SCREW	F-HJQ RSU BA-DA	3
4A	NAS1351-5H14P		. SCREW	F-HJQ RSU BA-DA	1
5	AN960PD516		. WASHER	ABCIK LMT V-X EA	4
6	NAS1104-42		. BOLT	ABCIK LMT V-X EA	1
6	NAS1104-22		. BOLT	DENPYZ	1
6	NAS1104-26		. BOLT	F-HJQ RSU BA-DA	1
6	NAS6204-26		. BOLT (OPT)	F-HJQ RSU BA-DA	1
6	BACB30NF4-26		. BOLT (OPT)	F-HJQ RSU BA-DA	1
7	AN960PD416		. WASHER		1
8	NAS679A4W		. NUT	ABCIKLM T V-X EA	1
8	MS21042L4		. NUT	D-HJ N-SU Y-DA	1
9	65-44868-1		. MANIFOLD ASSY, AUX (FIG. 1102)	ABCIKLM T V-X EA	1
9	69-54772-1		. COVER ASSY (FIG. 1102A)	DENPYZ	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-9	69-54772-24		. COVER ASSY (FIG. 1102A)	F-HJQ RSU BA-DA	1
9A	69-54774-1		. RETAINER ASSY	D-HJ N-SU Y-DA	1
9B	69-54774-3		. . BUSHING		1
9C	69-54774-2		. . RETAINER		1
10	68002		. CONNECTOR, HYD, V92003	ABCIKL MT V-X EA	2
10	69-54775-1		. PLUG	D-HJ N-SU Y-DA	2
11	NAS1611-010		. PACKING	ABCIKL MT V-X EA	4
11	NAS1611-010		. PACKING	D-HJ N-SU Y-DA	2
12	BACR12BM010		. RING, BACKUP	ABCIKL MT V-X EA	8
12	S12766-010		. RING, BACKUP, V97820 (OPT)	ABCIKL MT V-X EA	8
12	BACR12BM010		. RING, BACKUP	D-HJ N-SU Y-DA	4
12	S12766-010		. RING, BACKUP, V97820 (OPT)	D-HJ N-SU Y-DA	4
13	65-44864-2		. CYLINDER ASSY (FIG. 1103) (PRE SB 27-1145)	ABKLV W	1
13	65-44864-3		. CYLINDER ASSY (FIG. 1103) (REPLD BY 65-44864-4) *[4] (PRE SB 27-1145)	C-EMN PX-Z	1
13	65-44864-4		. CYLINDER ASSY (FIG. 1103) (REPLS 65-44864-3) (POST SB 27-1145) *[4]	A-E K-P V-Z	1
13	65-44864-3		. CYLINDER ASSY (FIG. 1103)	FQ BA	1
13	65-44864-4		. CYLINDER ASSY (FIG. 1103)	G-JRST CA-EA	1
13	65-44864-4		. CYLINDER ASSY (FIG. 1103) (OPT) *[5]	U	1
13	65-44864-5		. CYLINDER ASSY (FIG. 1103) (OPT) *[4]	C-J M-T X-EA	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
13	65-44864-5		. CYLINDER ASSY (FIG. 1103)	U	1
14	NAS679A4W		. NUT	ABCIKL MT V-X EA	2
14	MS21042L4		. NUT	D-HJ N-SU Y-DA	2
15	AN960PD416L		. WASHER		2
16	NAS1351-4H24P		. SCREW		2
17	HL73-6		. COLLAR, V73197		1
18	68094		. WASHER, V92003		1
19	NAS679A5		. NUT	ABCIKL MT V-X EA	1
20	BACB30LU3-37		. BOLT (REPLS NAS333CPA25-5)		1
21	66-22728-1		. BOLT		1
22	NAS1351-4H20P		. SCREW	ABCIKL MT V-X EA	8
22	NAS1351-4H20P		. SCREW	D-HJ N-SU Y-DA	4
23	NAS1611-112		. PACKING	ABCIKL MT V-X EA	2
23	NAS1611-112		. PACKING	D-HJ N-SU Y-DA	1
24	59154		. SCREW, V92003	ABCIKL MT V-X EA	2
24	59154		. SCREW, V92003	D-HJ N-SU Y-DA	1
25	NAS1611-213		. PACKING	ABCIKL MT V-X EA	16
25	NAS1611-213		. PACKING	D-HJ N-SU Y-DA	8
26	BACR12BM213		. RING, BACKUP	ABCIKL MT V-X EA	16

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-26	S12766-213		. RING, BACKUP, V97820 (OPT)	ABCIKL MT V-X EA	16
26	BACR12BM213		. RING, BACKUP	D-HJ N-SU Y-DA	8
26	S12766-213		. RING, BACKUP, V97820 (OPT)	D-HJ N-SU Y-DA	8
27	69-35609-1		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110) (PRE SB 27-1145)	AKV	2
27	69-35609-3		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110) (PRE SB 27-1145)	BCLM WX	2
27	69-35609-6		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110) (POST SB 27-1145)	ABCIKL MT V-X EA	2
27	69-35609-3		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110) (PRE SB 27-1145)	DNY	1
27	69-35609-5		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110) (PRE SB 27-1145)	EPZ	1
27	69-35609-6		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110) (POST SB 27-1145)	DENPYZ	1
27	69-35609-6		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110)	IT EA	2
27	69-35609-3		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110)	GR CA	1
27	69-35609-5		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110)	FQ BA	1
27	69-35609-6		. ACTUATOR ASSY, YAW DAMPER (FIG. 1110)	HJSU DA	1
28	59120		. CAP, FILTER, V92003		2
29	NAS1611-222		. PACKING		2
30	BACR12BM222		. RING, BACKUP		4
30	S12766-222		. RING, BACKUP (OPT)		4
31	AC4638E3		. ELEMENT, 6 GPM FILTER, V18350 (BOEING 10-60808-2)(OPT) *[1]	ABCIKL MT V-X EA	2
31	21-10033		. ELEMENT, 6 GPM FILTER, V81873 (BOEING 10-60808-2)(OPT) *[1]	ABCIKL MT V-X EA	2
31	21-11176		. ELEMENT, 6 GPM FILTER, V81873 (BOEING 10-60808-2)(OPT) *[1]	ABCIKL MT V-X EA	2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-31	4245-502		. ELEMENT, 6 GPM FILTER, V21550 (BOEING 10-60808-2,-4)(OPT) *[1]	ABCIKL MT V-X EA	2
31	7500272		. ELEMENT, 6 GPM FILTER, V05228 (BOEING 10-60808-2,-4)(OPT) *[1]	ABCIKL MT V-X EA	2
31	AC4638E31		. ELEMENT, 6 GPM FILTER, V18350 (BOEING 10-60808-4)(OPT) *[1]	ABCIKL MT V-X EA	2
31	4245-502		. ELEMENT, 6 GPM FILTER, V21550 (BOEING 10-60808-4)(OPT) *[1]	D-HJ N-SU Y-DA	2
31	7500272		. ELEMENT, 6 GPM FILTER, V05228 (BOEING 10-60808-4)(OPT) *[1]	D-HJ N-SU Y-DA	2
31	AC4638E31		. ELEMENT, 6 GPM FILTER, V18350 (BOEING 10-60808-4)(OPT) *[1]	D-HJ N-SU Y-DA	2
31	AC8818E2		. ELEMENT, 6 GPM FILTER, V18350 (BOEING SPEC 60B80034-2)(OPT) *[1]		2
31	11-10107		. ELEMENT, 6 GPM FILTER, V14818 (BOEING SPEC 60B80034-2)(OPT) *[1]		2
31	4228-633		. ELEMENT, 6 GPM FILTER, V21550 (BOEING SPEC 60B80034-2)(OPT) *[1]		2
31	7553575		. ELEMENT, 6 GPM FILTER, V05228 (BOEING SPEC 60B80034-2) (OPT) *[1]		2
32	NAS1611-116		. PACKING		2
33	BACR12BM116		. RING, BACKUP		4
33	S12766-116		. RING, BACKUP, V97820 (OPT)		4
34	59119		. CAP, FILTER, V92003	ABCIKL MT V-X EA	2
34	59119		. CAP, FILTER, V92003	D-HJ N-SU Y-DA	1
35	NAS1611-217		. PACKING	ABCIKL MT V-X EA	2
35	NAS1611-217		. PACKING	D-HJ N-S U Y-DA	1
36	BACR12BM217		. RING, BACKUP	ABCIKL MT V-X EA	4

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-36	S12766-217		. RING, BACKUP, V97820 (OPT)	ABCIKL MT V-X EA	4
36	BACR12BM217		. RING, BACKUP	D-HJ N-SU Y-DA	2
36	S12766-217		. RING, BACKUP, V97820 (OPT)	D-HJ N-SU Y-DA	2
37	AC4638E-1		. ELEMENT, 1 GPM FILTER, V18350 (BOEING 10-60808-1)(OPT) *[2]	ABCIKL MT V-X EA	2
37	21-10034		. ELEMENT, 1 GPM FILTER, V81873 (BOEING 10-60808-1)(OPT) *[2]	ABCIKL MT V-X EA	2
37	7500271		. ELEMENT, 1 GPM FILTER, V05228 (BOEING 10-60808-1)(OPT) *[2]	ABCIKL MT V-X EA	2
37	4245-501		. ELEMENT, 1 GPM FILTER, V21550 (BOEING 10-60808-1,-3)(OPT) *[2]	ABCIKL MT V-X EA	2
37	AC4638E11		. ELEMENT, 1 GPM FILTER, V18350 (BOEING 10-60808-3)(OPT) *[2]	ABCIKL MT V-X EA	2
37	7500272		. ELEMENT, 1 GPM FILTER, V05228 (BOEING 10-60808-3)(OPT) *[2]	ABCIKL MT V-X EA	2
37	AC8818E1		. ELEMENT, 1 GPM FILTER, V18350 (BOEING SPEC 60B80034-1)(OPT) *[2]	ABCIKL MT V-X EA	2
37	11-10106		. ELEMENT, 1 GPM FILTER, V14818 (BOEING SPEC 60B80034-1)(OPT) *[2]	ABCIKL MT V-X EA	2
37	4228-634		. ELEMENT, 1 GPM FILTER, V21550 (BOEING SPEC 60B80034-1)(OPT) *[2]	ABCIKL MT V-X EA	2
37	7553574		. ELEMENT, 1 GPM FILTER, V05228 (BOEING SPEC 60B80034-1)(OPT) *[2]	ABCIKL MT V-X EA	2
37	AC4638E-1		. ELEMENT, 1 GPM FILTER, V18350 (BOEING 10-60808-1)(OPT) *[2]	D-HJ N-SU Y-DA	1
37	21-10034		. ELEMENT, 1 GPM FILTER, V81873 (BOEING 10-60808-1)(OPT) *[2]	D-HJ N-SU Y-DA	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-37	7500271		. ELEMENT, 1 GPM FILTER, V05228 (BOEING 10-60808-1)(OPT) *[2]	D-HJ N-SU Y-DA	1
37	4245-501		. ELEMENT, 1 GPM FILTER, V21550 (BOEING 10-60808-1,-3)(OPT) *[2]	D-HJ N-SU Y-DA	1
37	AC4638E11		. ELEMENT, 1 GPM FILTER, V18350 (BOEING 10-60808-3)(OPT) *[2]	D-HJ N-SU Y-DA	1
37	7500272		. ELEMENT, 1 GPM FILTER, V05228 (BOEING 10-60808-3)(OPT) *[2]	D-HJ N-SU Y-DA	1
37	AC8818E1		. ELEMENT, 1 GPM FILTER, V18350 (BOEING SPEC 60B80034-1)(OPT) *[2]	D-HJ N-SU Y-DA	1
37	11-10106		. ELEMENT, 1 GPM FILTER, V14818 (BOEING SPEC 60B80034-1)(OPT) *[2]	D-HJ N-SU Y-DA	1
37	4228-634		. ELEMENT, 1 GPM FILTER, V21550 (BOEING SPEC 60B80034-1)(OPT) *[2]	D-HJ N-SU Y-DA	1
37	7553574		. ELEMENT, 1 GPM FILTER, V05228 (BOEING SPEC 60B80034-1)(OPT) *[2]	D-HJ N-SU Y-DA	1
38	NAS1611-012		. PACKING	ABCIKL MT V-X EA	2
38	NAS1611-012		. PACKING	D-HJ N-SU Y-DA	1
39	BACR12BM012		. RING, BACKUP	ABCIKL MT V-X EA	4
39	S12766-012		. RING, BACKUP, V97820 (OPT)	ABCIKL MT V-X EA	4
39	BACR12BM012		. RING, BACKUP	D-HJ N-SU Y-DA	2
39	S12766-012		. RING, BACKUP, V97820 (OPT)	D-HJ N-SU Y-DA	2
40	NAS1351-4H10P		. SCREW, CAP	ABCIKL MT V-X EA	8

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-40	NAS1351-4H10P		. SCREW, CAP	D-HJ N-SU Y-DA	4
41	59600-5011		. VALVE ASSY, SOLENOID, V92003 (BOEING 10-60811-9) (OPT)	ABCIKL MT	2
41	45080-1		. VALVE ASSY, SOLENOID, V99643 (BOEING 10-60811-8) (PREF)	ABCIKL MT V-X EA	2
41	59600-5007		. VALVE ASSY, SOLENOID, V92003 (BOEING 10-60811-3) (OPT)	ABCIKL MT	2
41	45080		. VALVE ASSY, SOLENOID, V99643 (BOEING 10-60811-3) (OPT) (FIG. 1107)	ABCIKL MT V-X EA	2
41	59600-5003		. VALVE ASSY, SOLENOID, V92003 (BOEING 10-60811-1) (OPT) (FIG. 1107)	ABCIKL MT	2
41	881600-1001		. VALVE ASSY, SOLENOID, V92003 (BOEING 10-60811-13) (OPT)	ABCIKL MT V-X EA	2
41	59600-5011		. VALVE ASSY, SOLENOID, V92003 (BOEING 10-60811-9) (OPT)	D-HJ N-S	1
41	45080-1		. VALVE ASSY, SOLENOID, V99643 (BOEING 10-60811-8) (PREF)	D-HJ N-SU Y-DA	1
41	59600-5007		. VALVE ASSY, SOLENOID, V92003 (BOEING 10-60811-3) (OPT)	D-HJ N-S	1
41	45080		. VALVE ASSY, SOLENOID, V99643 (BOEING 10-60811-3) (OPT)	D-HJ N-SU Y-DA	1
41	59600-5003		. VALVE ASSY, SOLENOID, V92003 (BOEING 10-60811-1) (OPT) (FIG. 1107)	D-HJ N-S	1
41	881600-1001		. VALVE ASSY, SOLENOID, V92003 (BOEING 10-60811-13) (OPT)	D-HJ N-SU Y-DA	1
42	NAS1611-112		. PACKING	ABCIKL MT V-X EA	2
42	NAS1611-112		. PACKING	D-HJ N-SU Y-DA	1
43	69-20184-1		. PLATE, SEAL	ABCIKL MT V-X EA	2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-43	69-20184-1		. PLATE, SEAL	D-HJ N-SU Y-DA	1
44	NAS1351-4H28P		. SCREW, CAP	ABCIKL MT V-X EA	8
44	NAS1351-4H28P		. SCREW, CAP	D-HJ N-SU Y-DA	4
45	75130		. SERVO VALVE, ELECTRO HYD, V75250 (BOEING 10-60813-1) (OPT BOEING S252T001-3, -4, -5)	ABCIKL MT V-X EA	2
45	A22584		DELETED		
45	22280710		DELETED		
45	22280710-001		. SERVO VALVE, ELECTRO HYD, V81873 (BOEING S252T001-3)(OPT BOEING 10-60813-1)(OPT BOEING S252T001 4,-5)	ABCIKL MT V-X EA	2
45	73016		. SERVO VALVE, ELECTRO HYD, V75250 (BOEING S252T001-4) (OPT BOEING 10-60813-1) (OPT BOEING S252T001-3,-5)	ABCIKL MT V-X EA	2
45	A71882-1		. SERVO VALVE, ELECTRO HYD, V94697 (BOEING S252T001-5) (OPT BOEING 10-60813-1) (OPT BOEING S252T001-4,-5)	ABCIKL MT V-X EA	2
45	75130		. SERVO VALVE, ELECTRO HYD, V75250 (BOEING 10-60813-1) (OPT BOEING S252T001-3,-4,-5)	D-HJ N-SU Y-DA	1
45	A22584		DELETED		
45	22280710		DELETED		
45	22280710-001		. SERVO VALVE, ELECTRO HYD, V81873 (BOEING S252T001-3) (OPT BOEING 10-60813-1) (OPT BOEING S252T001-4,-5)	D-HJ N-SU Y-DA	1
45	73016		. SERVO VALVE, ELECTRO HYD, V75250 (BOEING S252T001-4) (OPT BOEING 10-60813-1) (OPT BOEING S252T001-3,-5)	D-HJ N-SU Y-DA	1
45	A71882-1		. SERVO VALVE, ELECTRO HYD, V94697 (BOEING S252T001-5)(OPT BOEING 10-60813-1) (OPT BOEING S252T001-3, -4)	D-HJ N-SU Y-DA	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-46	NAS1611-112		. PACKING	ABCIKL MT V-X EA	2
46	NAS1611-112		. PACKING	D-HJ N-SU Y-DA	1
47	69-20185-1		. PLATE, SEAL	ABCIKL MT V-X EA	2
47	69-20185-1		. PLATE, SEAL	D-HJ N-SU Y-DA	1
48	60754-3		. CAP, V92003		2
49	NAS1611-116		. PACKING, O-RING		2
50	BACR12BM116		. RING, BACKUP		4
50	S12766-116		. RING, BACKUP, V97820 (OPT)		4
51	68061-3		. VALVE ASSY, BYPASS, V92003		2
52	68063		. . SLEEVE, BYPASS VALVE, V92003		1
53	68064		. . SLIDE, BYPASS VALVE, V92003		1
54	NAS1611-113		. PACKING		8
55	BACR12BM113		. RING, BACKUP		16
55	S12766-113		. RING, BACKUP, V97820 (OPT)		16
56	68062		. SPRING, V92003		2
57	59149		. CAP, V92003		2
58	NAS1612-10		. PACKING		2
59	62000-5003		. VALVE, CHECK, V92003 (BOEING 10-60503-4)		2
60	62001		. . SEAT, V92003		1
61	62003		. . POPPET, V92003		1
62	62004		. . SPRING, V92003		1
63	62005		. . CAGE, V92003		1
64	NAS1611-113		. PACKING		2
65	BACR12BM113		. RING, BACKUP		4
65	S12766-113		. RING, BACKUP, V97820 (OPT)		4
66	59110		. CAP, V92003 *[3]		2
67	NAS1612-10		. PACKING *[3]		2
68	69-54599-1		. PLUG, FLOW CONTROL (PREF) *[3]		2
68	59800-5001		. VALVE, THERMOSTATIC FLOW CONTROL V92003 (BOEING 10-60809-1) (OPT)	A-G K-R V-CA	2
69	NAS1611-012		. PACKING, O-RING *[3]		2
70	BACR12BM012		. RING, BACKUP *[3]		4
70	S12766-012		. RING, BACKUP, V97820 (OPT) *[3]		4

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
71	BAC27DHY0269		. NAMEPLATE (PREF)	A-IU	1
71	BAC27DHY6		. NAMEPLATE (OPT)	A-I	1
71	BAC27DHY0358		. NAMEPLATE	K-T	1
71	83301		. NAMEPLATE (OPT) (V92003)	U	1
71	BAC27DHY0390		. NAMEPLATE	V-EA	1
72	69-35566-1		. CRANK ASSY (FIG. 1105)	ABKLV W	1
72	69-35566-3		. CRANK ASSY (FIG. 1105) (OPT)	ABKLV W	1
72	69-35566-3		. CRANK ASSY (FIG. 1105)	C-JM-U X-EA	1
72A	69-35567-1		. LEVER ASSY, SUMMING (FIG. 1105)		1
72B	69-35563-1		. LINK ASSY (FIG. 1105)		1
73	NO ASSIGNED P/N		. MANIFOLD BUILDUP, AFT (FIG. 1106)		1

*[1] FOR ALL RUDDER POWER CONTROL UNIT ASSEMBLIES BUT 65-44861-11,-12: BOEING SPEC 10-60808-2 AND 60B80034-2 OPTIONAL TO 10-60808-4. FOR 65-44861-11, -12 ASSEMBLIES: BOEING SPEC 60B80034-2 OPTIONAL TO 10-60808-4.

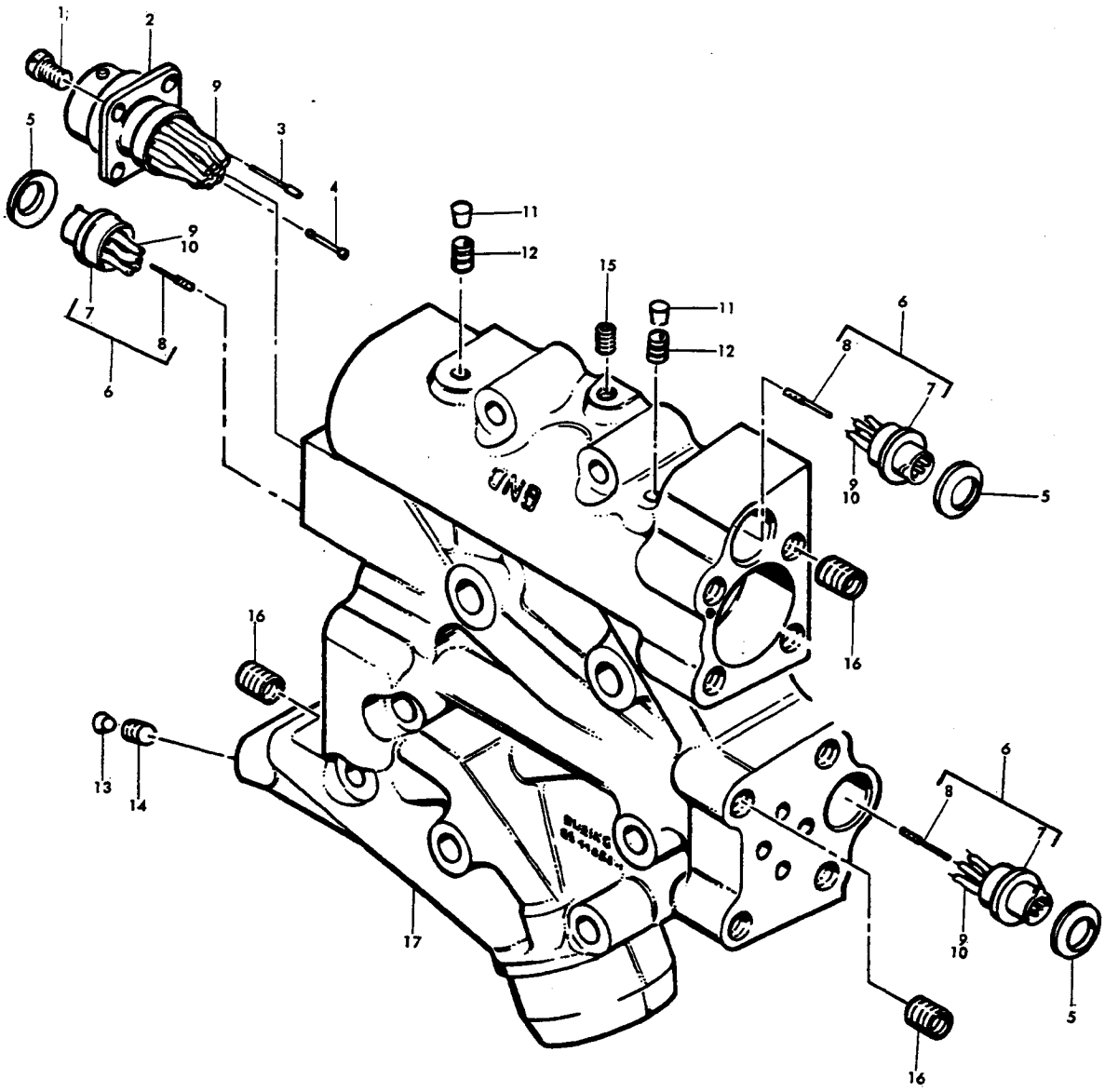
*[2] BOEING SPEC 10-60808-1 AND 60B80034-1 OPTIONAL TO 10-60808-3.

*[3] USED WITH CYLINDER ASSY (ITEM 13), 65-44864-2, -3, -4 ONLY.

*[4] 65-44864-5 OPTIONAL TO 65-44864-4 PLUS PARTS INDICATED BY *[3] OPTIONAL TO 65-44864-3 PLUS PARTS INDICATED BY *[3].

*[5] 65-44864-4 PLUS PARTS INDICATED BY *[3] ARE OPTIONAL TO 65-44864-5.

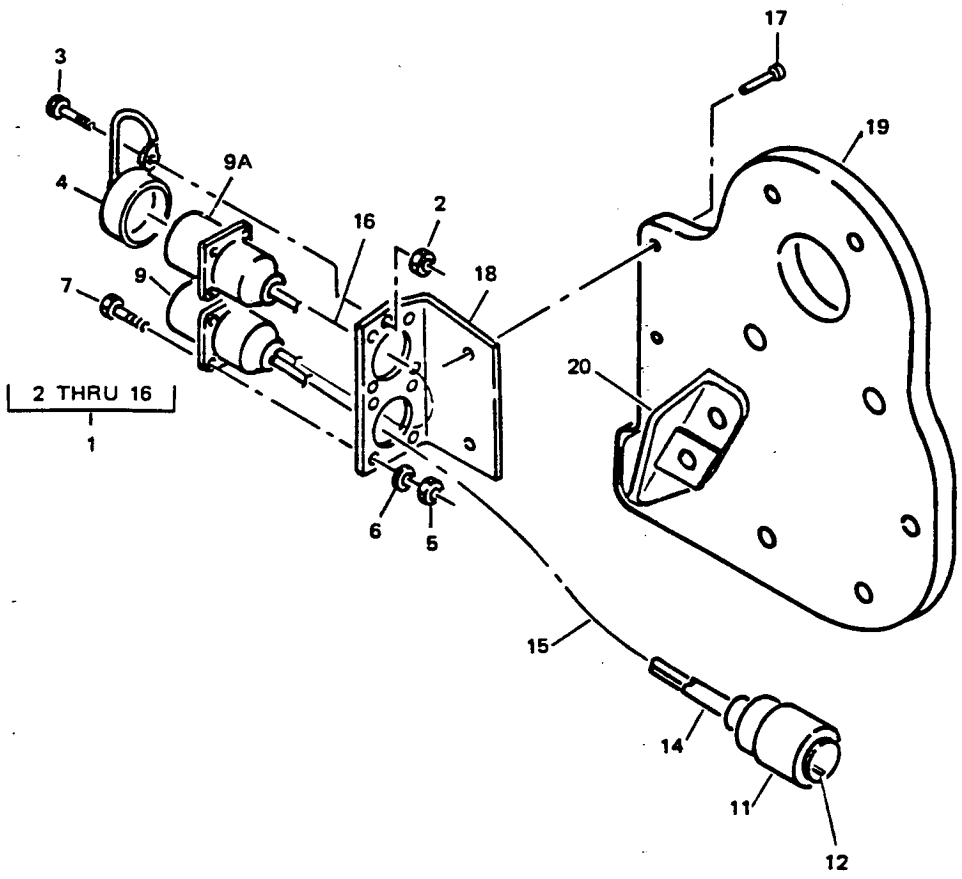
3. Exploded View



Auxiliary Manifold 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-					
	65-44868-1		AUXILIARY MANIFOLD ASSEMBLY		RF
1	AN500AD4-4		. SCREW		4
2	48-10R12-12P (120)		. RECEPTACLE, V07497		1
3	BACC47CN-1		. PIN, CONTACT		12
3	48-2335-02		. PIN, CONTACT, V07497 (OPT)		12
4	48-2221-20		. PLUG, SEALING		1
5	59140		. RETAINER, V92003		3
6	000100-0113		. PLUG ASSEMBLY, V05574		3
7	102-0010-000		. . SHELL, PLUG, V05574		1
8	019-0039-000		. . PIN, CONTACT, V05574		4
9	65-44868-11		. WIRE, WHITE *[1]		1
9	65-44868-12		. WIRE, BLACK *[1]		1
9	65-44868-14		. WIRE, BROWN *[1]		1
9	65-44868-15		. WIRE, RED *[1]		1
9	65-44868-16		. WIRE, YELLOW *[1]		1
9	65-44868-17		. WIRE, GRAY *[1]		1
9	65-44868-18		. WIRE, BLUE *[1]		1
9	65-44868-19		. WIRE, WHITE WITH GRAY TRACER *[1]		1
9	65-44868-20		. WIRE, WHITE WITH BLACK TRACER *[1]		1
9	65-44868-21		. WIRE, WHITE WITH YELLOW TRACER *[1]		1
9	65-44868-22		. WIRE, WHITE WITH RED TRACER *[1]		1
10	65-44868-13		. TUBING		11
11	BACP20AX12DP		. PIN		2
12	BACP20AX12D		. PLUG		2
13	BACP20AX18DP		. PIN		1
14	BACP20AX18D		. PLUG		1
15	MS21209F1-15		. INSERT		1
16	MS21209F4-15		. INSERT		12
17	65-44866-1		. MANIFOLD		1

*[1] WIRE SPEC: MIL-W-16878 TYPE EE 24 GAGE, 19 STRAND

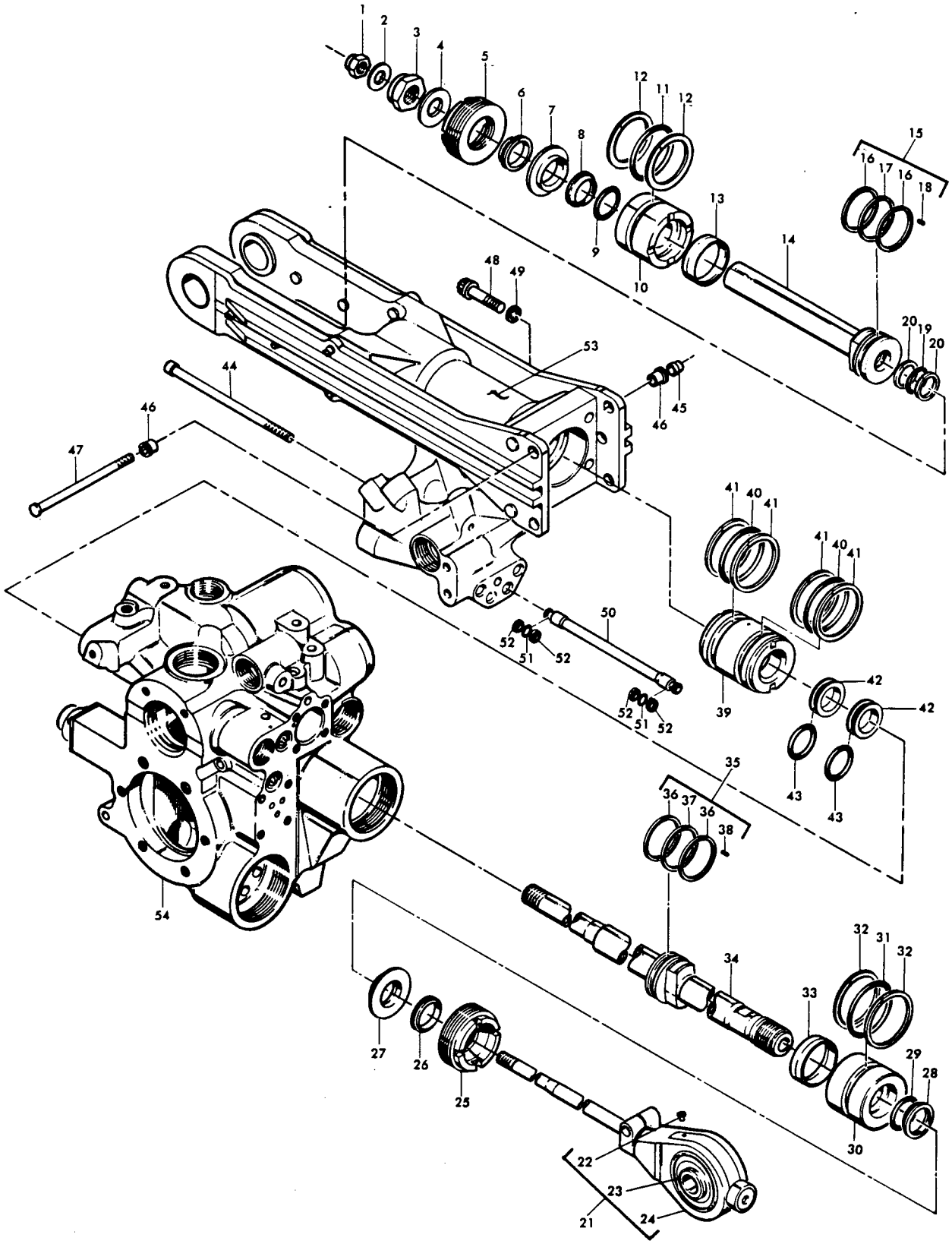


Cover Assembly
Figure 1102A

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102A-					
	69-54772-1		COVER ASSY (FIG. 1101)	A	RF
	69-54772-24		COVER ASSY (FIG. 1101)	B	RF
1	69-54772-35		. BUNDLE, WIRE		1
2	NAS671-2		. . NUT		1
3	NAS1351-02-4		. . SCREW		1
4	MS27295-2		. . CAP, PROTECTIVE		1
4	48-2149		. . CAP, PROTECTIVE (OPT) (V02660)		1
4	M83723-60-212AC		. . CAP, PROTECTIVE (OPT)		1
5	BACN10JC04		. . NUT		8
6	AN960PD4		. . WASHER		8
7	BACS12CB04-5		. . SCREW		8
9	BACC45FN12C12P6		. . RECEPTACLE		1
9A	BACC45FN12C12P		. . RECEPTACLE		1
11	BACC45FT12C12S6		. . PLUG		1
12	BACC47CN1		. . PIN, CONTACT		33
13	48-2221-20		. . PLUG, SEALING, V02660		3
13	69-54772-36		. . PLUG, SEALING (OPT)		AR
14	RT876		. . SLEEVING, V06090		AR
15	69-54772-2		. . WIRE, WHITE/BLUE, BROWN TRACER *[1]		1
15	69-54772-3		. . WIRE, WHITE/YELLOW, BROWN TRACER *[1]		1
15	69-54772-4		. . WIRE, WHITE/RED, BROWN TRACER *[1]		1
15	69-54772-5		. . WIRE, WHITE/BLACK, BROWN TRACER *[1]		1
15	69-54772-6		. . WIRE, WHITE, GRAY TRACER *[1]		1
15	69-54772-7		. . WIRE, WHITE/ORANGE, BROWN TRACER *[1]		1
15	69-54772-8		. . WIRE, WHITE/GREEN, BROWN TRACER *[1]		1
15	69-54772-9		. . WIRE, WHITE, ORANGE TRACER *[1]		1
15	69-54772-10		. . WIRE, WHITE, BLUE TRACER *[1]		1
15	69-54772-11		. . WIRE, WHITE, BLACK TRACER *[1]		1
15	69-54772-12		. . WIRE, WHITE, RED TRACER *[1]		1
16	69-54772-13		. . WIRE, WHITE/BLUE, BROWN TRACER *[1]		1
16	69-54772-14		. . WIRE, WHITE/YELLOW, BROWN TRACER *[1]		1
16	69-54772-15		. . WIRE, WHITE/RED, BROWN TRACER *[1]		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102A-					
16	69-54772-16		. . WIRE, WHITE/BLACK, BROWN TRACER *[1]		1
16	69-54772-17		. . WIRE, WHITE, GRAY TRACER *[1]		1
16	69-54772-18		. . WIRE, WHITE/ORANGE, BROWN TRACER *[1]		1
16	69-54772-19		. . WIRE, WHITE/GREEN, BROWN TRACER *[1]		1
16	69-54772-20		. . WIRE, WHITE, ORANGE TRACER *[1]		1
16	69-54772-21		. . WIRE, WHITE, BLUE TRACER *[1]		1
16	69-54772-22		. . WIRE, WHITE, BLACK TRACER *[1]		1
16	69-54772-23		. . WIRE, WHITE, RED TRACER *[1]		1
17	BACR15BA5D		. RIVET		2
18	66-22531-1		. BRACKET		1
19	69-54773-1		. COVER		1
20	69-74727-1		. STIFFENER ASSY	B	1

*[1] WIRE SPEC: 24 GAGE AWG WIRE, PER BMS 13-10 TYPE I, CLASS I



Cylinder Assembly Buildup
Figure 1103

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1103-					
	65-44864-2		CYLINDER ASSY BUILDUP	A	RF
	65-44864-3		CYLINDER ASSY BUILDUP	B	RF
	65-44864-4		CYLINDER ASSY BUILDUP	C	RF
	65-44864-5		CYLINDER ASSY BUILDUP	D	RF
1	NAS679A6		. NUT, SELF-LOCKING		1
2	MS20002-6		. WASHER, PLAIN		1
3	BACN10BY510		. NUT		1
4	MS20002-10		. WASHER, PLAIN		1
5	69-35540-1		. NUT		1
6	BACS34A7A		. SCRAPER		1
7	69-35534-1		. RETAINER		1
8	GTC5394C212		. SEAL ASSY, V72902 *[3] (PRE SB 27-1145)	AB	1
8	BACS11AA212A		. SEAL, FOOT *[6] (POST SB 27-1145)		1
8	BACS11AA212A		. SEAL, FOOT *[3]*[6]		1
8	S33121-212H5		. SEAL, FOOT *[3]	BCD	1
9	NAS1611-212		. PACKING, O-RING *[6] (POST SB 27-1145)		1
9	NAS1611-212		. PACKING, O-RING *[6]		1
10	69-35533-1		. BEARING, END		1
11	NAS1611-223		. PACKING, O-RING		1
12	BACR12BM223		. RING, BACKUP		2
12	S12766-223		. RING, BACKUP, V97820 (OPT)		2
13	69-35537-1		. RING		1
14	69-35539-1		. PISTON, FORWARD		1
14	S242624-1		. PISTON, FWD (0.015 OVERSIZE) V92003 *[1]		1
14	S242624-3		. PISTON, FWD (0.030 OVERSIZE) V92003 *[1]		1
15	7217MT952T		. SEAL ASSY, V72902		1
15	65-44583-3		. SEAL ASSY, PISTON (OPT TO 7217MT952T)		1
15	242615-5		. SEAL ASSY, PISTON (0.015 OVERSIZE) V92003 *[1]		1
15	721M7MT952T		. SEAL ASSY, PISTON (0.015 OVERSIZE) V72902 (OPT) *[1]		1
15	242615-7		. SEAL ASSY, PISTON (0.030 OVERSIZE) V92003 *[1]		1
15	721P7MT952T		. SEAL ASSY, PISTON (0.030 OVERSIZE) V72902 (OPT) *[1]		1
16	65-44583-15		. . SEAL, CHAMFER (USED ON 65-44583-3)		2
16	242615-15		. . SEAL, CHAMFER (0.015 OVERSIZE) V92003 (USED ON 242615-5)*[1]		2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1103-					
16	242615-17		. . SEAL, CHAMFER (0.030 OVERSIZE) V92003 (USED ON 242615-7) *[1]		2
17	65-44583-16		. . SEAL (USED ON 65-44583-3)		1
17	242615-23		. . SEAL (0.015 OVERSIZE) V92003 (USED ON 242615-5) *[1]		1
17	242615-25		. . SEAL (0.030 OVERSIZE) V92003 (USED ON 242615-7) *[1]		1
18	65-44583-10		. . KEY (USED ON 65-44583-3)		1
18	242615-9		. . KEY, V92003 (USED ON 242615-5, -7) *[1]		1
19	NAS1611-115		. PACKING, O-RING		1
20	BACR12BM115		. RING, BACKUP		2
20	S12766-115		. RING, BACKUP, V97820 (OPT)		2
21	69-35535-3		. ROD END ASSY		1
21	69-35535-1		. ROD END ASSY (OPT)		1
22	NAS516-1		. . FITTING, LUBRICATION		1
23	BACB10C94H		. . BEARING		1
23	DAS10-31A1-505		. . BEARING, V77896 *[5]		1
24	69-35535-4		. . BONDED ASSY, ROD END (USED ON 69-35535-3		1
24	69-35535-2		. . BRAZE ASSY, ROD END (USED ON 69-35535-1)		1
25	69-35540-1		. NUT		1
26	BACS34A7A		. SCRAPER		1
27	69-35534-1		. RETAINER		1
28	GTC5394C212		. SEAL ASSY, V72902 *[3] (PRE SB 27-1145)	AB	1
28	BACS11AA212A		. SEAL, FOOT *[6] (POST SB 27-1145)		1
28	BACS11AA212A		. SEAL, FOOT *[3]*[6]		1
28	S33121-212H5		. SEAL, FOOT *[3]	BCD	1
29	NAS1611-212		. PACKING, O-RING *[6] (POST SB 27-1145)		1
29	NAS1611-212		. PACKING, O-RING *[6]		1
30	69-35533-1		. BEARING, END		1
31	NAS1611-223		. PACKING, O-RING		1
32	BACR12BM223		. RING, BACKUP		2
32	S12766-223		. RING, BACKUP, V97820 (OPT)		2
33	69-35537-1		. RING		1
34	65-44867-1		. PISTON, AFT		1
34	S242623-1		. PISTON, AFT (0.015 OVERSIZE) V92003 *[1]		1
34	S242623-3		. PISTON AFT (0.030 OVERSIZE) V92003 *[1]		1
35	65-44583-3		. SEAL ASSY, PISTON		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1103-					
35	7217MT952T		. SEAL ASSY, PISTON (OPT TO 65-44583-3)		1
35	242615-5		. SEAL ASSY, PISTON (0.015 OVERSIZE V92003 *[1]		1
35	721M7MT952T		. SEAL ASSY, PISTON (0.015 OVERSIZE) V72902 (OPT) *[1]		1
35	242615-7		. SEAL ASSY, PISTON (0.030 OVERSIZE) V92003 *[1]		1
35	721P7MT952T		. SEAL ASSY, PISTON (0.030 OVERSIZE) V72902 (OPT) *[1]		1
36	65-44583-15		. . SEAL, CHAMFER (USED ON 65-44583-3)		2
36	242615-15		. . SEAL, CHAMFER (0.015 OVERSIZE) V92003 (USED ON 242615-5) *[1]		2
36	242615-17		. . SEAL, CHAMFER (0.030 OVERSIZE) V92003 (USED ON 242615-7) *[1]		2
37	65-44583-16		. . SEAL (USED ON 65-44583-3)		1
37	242615-23		. . SEAL (0.015 OVERSIZE) V92003 (USED ON 242615-5) *[1]		1
37	242615-25		. . SEAL (0.030 OVERSIZE) V92003 (USED ON 242615-7) *[1]		1
38	65-44583-10		. . KEY (USED ON 65-44583-3)		1
38	242615-9		. . KEY, V92003 (USED ON 242615-5,-7) *[1]		1
39	69-35561-1		. BEARING, CENTER		1
40	NAS1611-223		. PACKING, O-RING		2
41	BACR12BM223		. RING, BACKUP		4
41	S12766-223		. RING, BACKUP, V97820 (OPT)		4
42	S34435-212H99		. SEAL ASSY, V97820 (POST SB 27-1145)		2
42	7212FT952T		. SEAL ASSY, V72902 *[2] (PRE SB 27-1145)	AB	2
42	S34435-212H99		. SEAL ASSY, V97820 *[2]		2
42	S34712-212H5		. SEAL, FOOT, V97820 *[2]	BCD	2
42	BACR12BJ212A		. SEAL, ROD *[2]*[7] (PRE SB 27-1145)		2
43	NAS1611-212		. PACKING, O-RING *[7] (PRE SB 27-1145)		2
44	NAS1351-4H40P		. SCREW, CAP		1
45	BACC30M8		. COLLAR		2
46	NAS77-4-31		. BUSHING, FLANGED		4
47	BACB30FM8-57		. BOLT		2
48	BACB30FD5H20		. BOLT (REPLD BY BACB30LE5H20)		4
48	BACB30LE5H20		. BOLT (REPLS BACB30FD5H20, REPLD BY BACB30LE5HK20)		4

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1103-					
48	BACB30LE5HK20		. BOLT (REPLS BACB30LE5H20)		4
49	MS20002C5		. WASHER, COUNTERSUNK		4
50	66-22752-1		. TUBE, CONNECTOR		4
51	NAS1611-009		. PACKING, O-RING		8
52	BACR12BM009		. RING, BACKUP		16
52	S12766-009		. RING, BACKUP, V97820 (OPT)		16
53	65-44865-5		. MANIFOLD ASSY, FWD (FIG. 1104)	A	1
53	65-44865-12		. MANIFOLD ASSY, FWD (FIG. 1104)	BC	1
53	65-44865-15		. MANIFOLD ASSY, FWD (OPT) (FIG. 1104)	BC	1
53	65-44865-8		. MANIFOLD ASSY, FWD (OPT) (FIG. 1104)	BC	1
53	65-44865-19		. MANIFOLD ASSY, FWD (FIG. 1104)	D	1
54	65-44862-14		. MANIFOLD ASSY, AFT (FIG. 1109)	A	1
54	65-44862-15		. MANIFOLD ASSY, AFT (FIG. 1109)	BC	1
54	65-44862-16		. MANIFOLD ASSY, AFT (FIG. 1109)	D	1
55	65C30874-1		. MANIFOLD ASSY, REPAIR *[4]		1

*[1] REPAIR PARTS. 0.015 OVERSIZE PARTS MUST BE USED TOGETHER AND 0.030 OVERSIZE PARTS MUST BE USED TOGETHER (REF MANIFOLD [11, FIG. 1104] AND [23, FIG. 1109]).

*[2] 7212FT952T (ITEM 42) IS OPTIONAL TO BACR12BJ212A (ITEM 42), S34435-212H99 (ITEM 42), AND IS OPTIONAL TO S34712-212H5 (ITEM 42) WHICH IS THE PREFERRED SPARE.

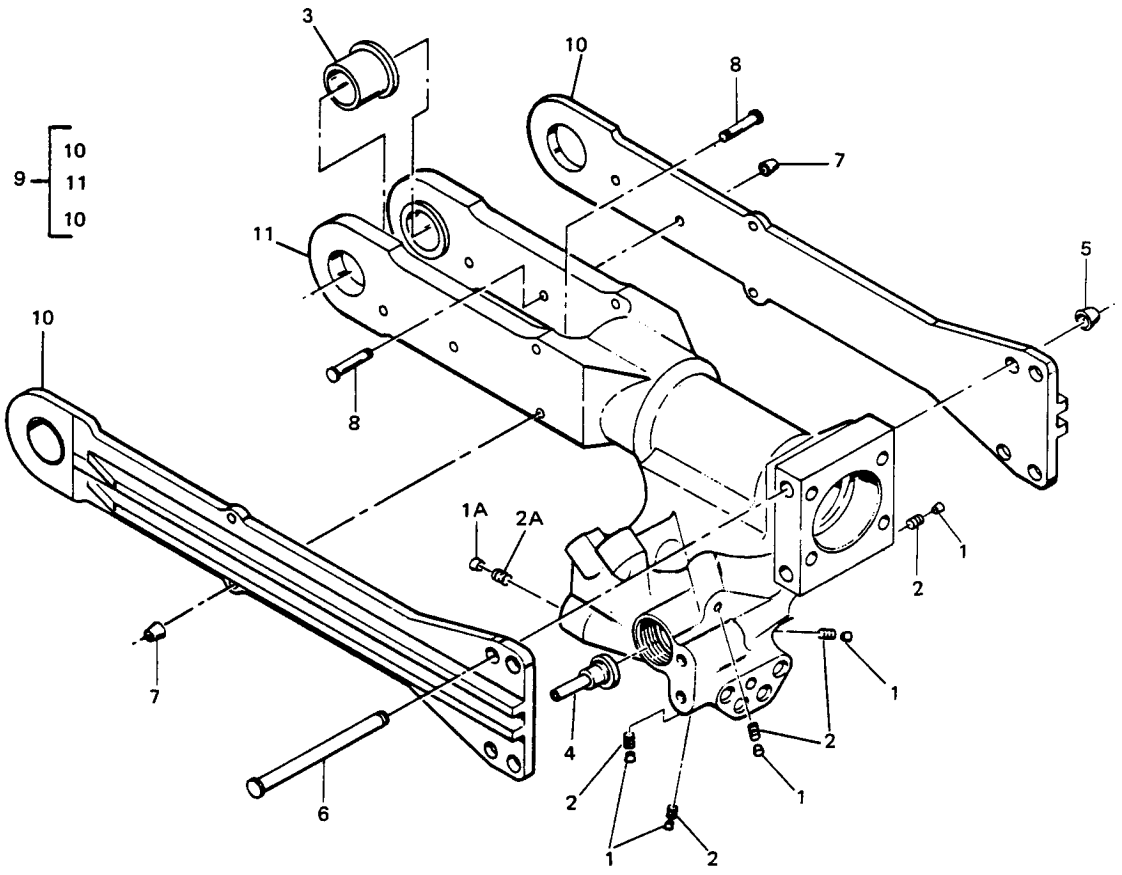
*[3] GTC5394C212 (ITEM 8 OR ITEM 28) IS OPTIONAL TO BACS11AA212A (ITEM 8 OR ITEM 28) AND IS OPTIONAL TO S33121-212H5 (ITEM 8 OR ITEM 28) WHICH IS THE PREFERRED SPARE.

*[4] REPAIR PART CONSISTS OF FORWARD MANIFOLD ASSEMBLY MADE FROM REPAIR MANIFOLD 65C30874-2 WITH SLEEVE 65C30874-4 AND AFT MANIFOLD ASSEMBLY MADE FROM REPAIR MANIFOLD 65C30874-3 WITH SLEEVE 65C30874-4.

*[5] REPLACEMENT BEARING USED IN CYLINDER ASSEMBLY BUILDUP REPAIR, METHOD 2, PAR. E(2).

*[6] BACS11AA212A SEAL IS USED WITH NAS1611-212 O-RING.

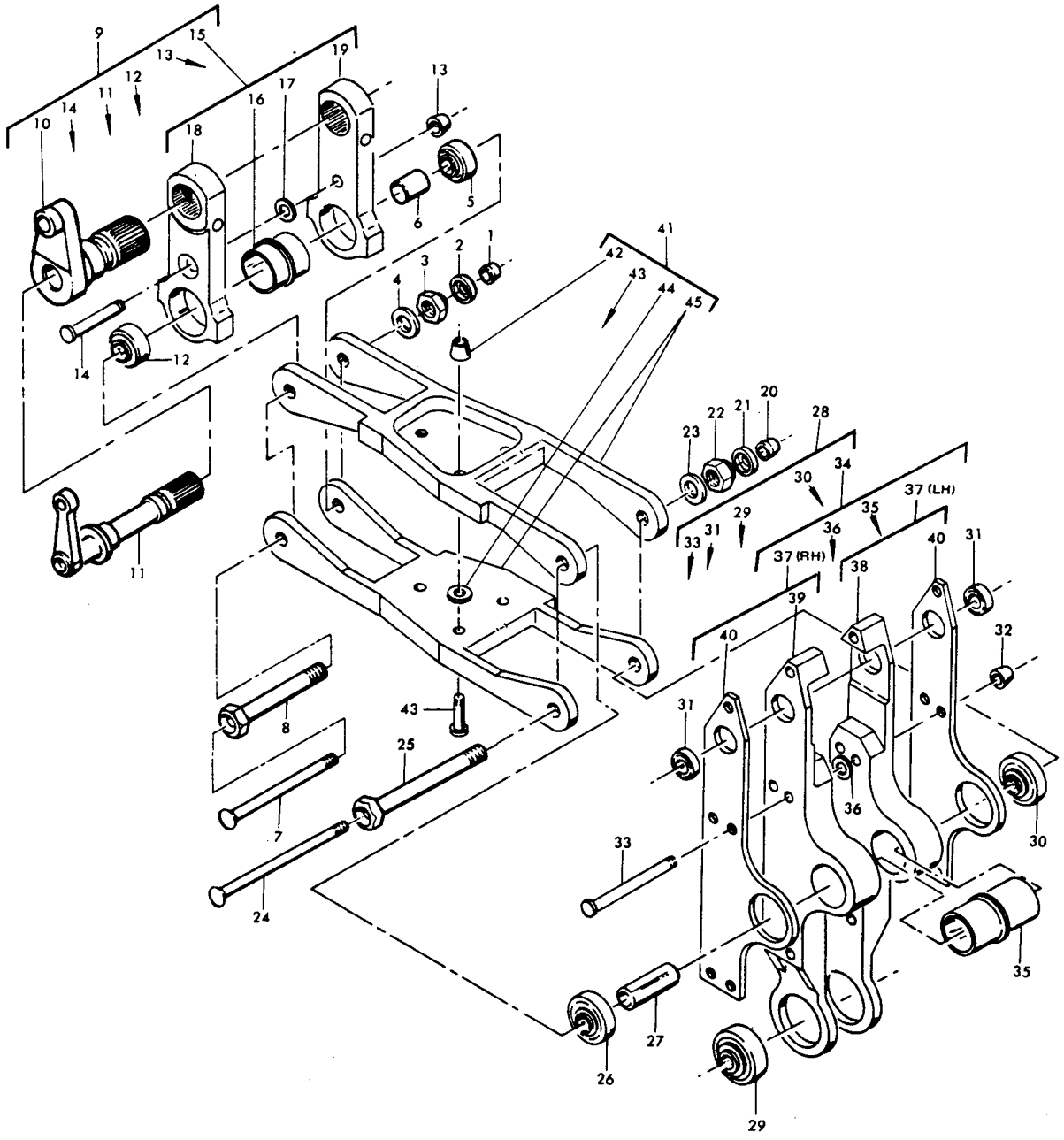
*[7] BACR12BJ212A SEAL IS USED WITH NAS1611-212 O-RING.



Forward Manifold Assembly
Figure 1104

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1104-					
	65-44865-5		FORWARD MANIFOLD ASSY	A	RF
	65-44865-8		FORWARD MANIFOLD ASSY	B	RF
	65-44865-12		FORWARD MANIFOLD ASSY	C	RF
	65-44865-15		FORWARD MANIFOLD ASSY	D	RF
	65-44865-19		FORWARD MANIFOLD ASSY	E	RF
1	BACP20AX18DP		. PIN		5
1A	BACP20AX21DP		. PIN	E	1
2	BACP20AX18D		. PLUG		5
2A	BACP20AX21D		. PLUG	E	1
3	69-35538-1		. BUSHING		2
4	69-35967-2		. STOP		1
5	BACC30M8		. COLLAR		2
6	BACB30FM8-55		. BOLT		2
7	BACC30M6		. COLLAR		8
8	BACB30FM6-11		. BOLT		8
9	65-44865-4		. MANIFOLD ASSY, BOND	A	1
9	65-44865-7		. MANIFOLD ASSY, BOND	B	1
9	65-44865-11		. MANIFOLD ASSY, BOND	C	1
9	65-44865-14		. MANIFOLD ASSY, BOND	D	1
9	65-44865-18		. MANIFOLD ASSY, BOND	E	1
9	65C30874-2		. MANIFOLD ASSY *[3]		1
10	69-35562-1		. . SIDEPLATE		2
11	65-44865-2		. . MANIFOLD	A	1
11	65-44865-6		. . MANIFOLD	B	1
11	65-44865-10		. . MANIFOLD	C	1
11	65-44865-13		. . MANIFOLD	D	1
11	65-44865-17		. . MANIFOLD	E	1
11	242621-1		. . MANIFOLD (0.015 OVERSIZE ANODIZED BORE), V92003 *[1]		1
11	242621-3		. . MANIFOLD (0.030 OVERSIZE ANODIZED BORE), V92003 *[2]		1
11	242621RW1		. . MANIFOLD (STD SIZE CHROME PLATED BORE), V92003 (REPAIR PART)		1
11	242621RW1-1		. . MANIFOLD (0.015 OVERSIZE CHROME PLATED BORE), V92003 *[1]		1
11	242621RW1-3		. . MANIFOLD (0.030 OVERSIZE CHROME PLATED BORE), V92003 *[2]		1

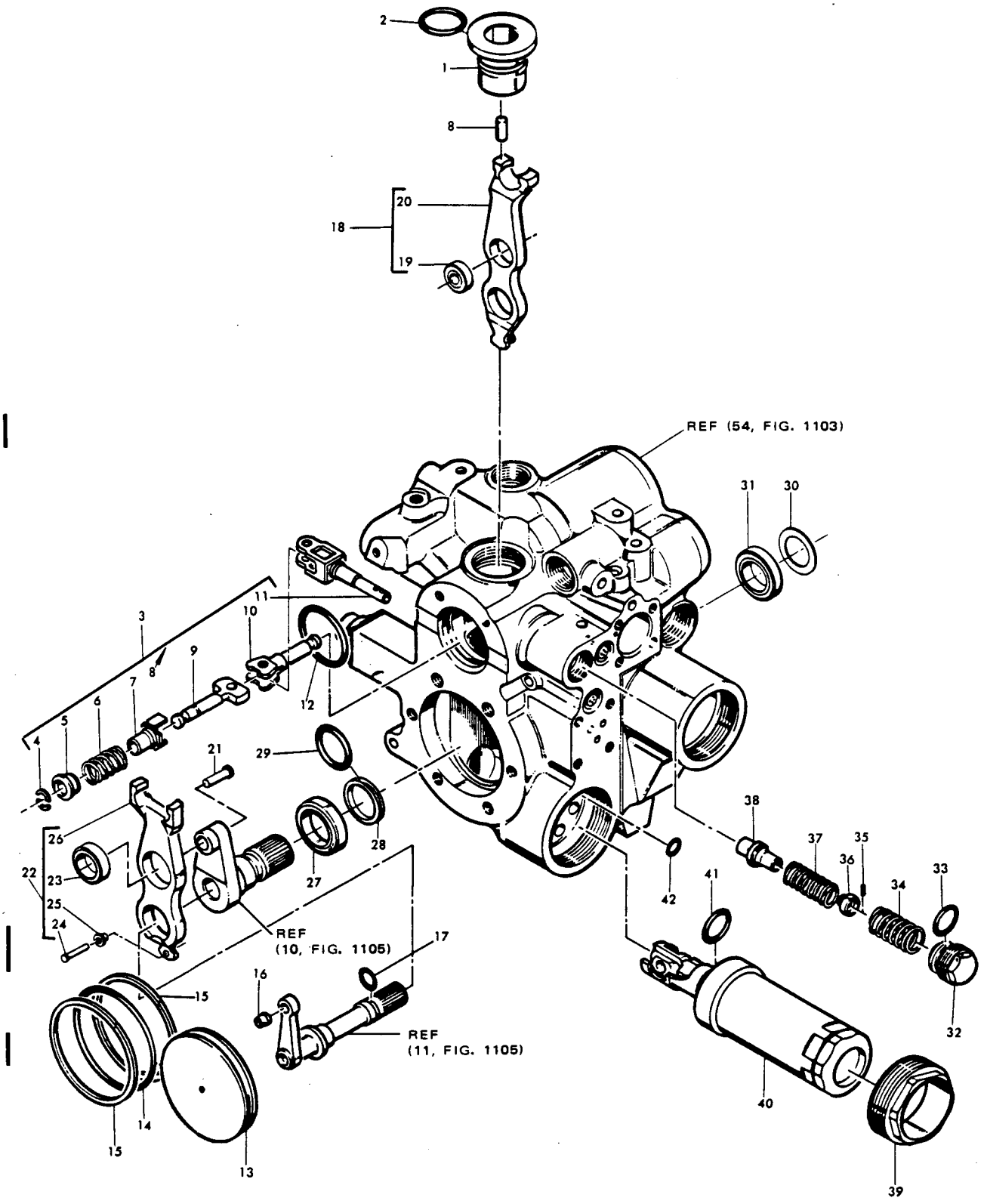
*[1] REPAIR PART USED WITH 0.015 OVERSIZE PARTS (REF ITEMS 14, 15, FIG. 1103)
*[2] REPAIR PART USED WITH 0.030 OVERSIZE PARTS (REF ITEMS 14, 15, FIG. 1103)
*[3] REPAIR PART USED WITH SLEEVE 65C30874-4



Crank, Link and Summing Lever Assemblies
Figure 1105

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1105-	NO ASSIGNED P/N		LEVER ASSYS, CRANK, LINK, AND SUMMING		RF
1	HL73-8		. COLLAR, V73197		1
2	68093		. WASHER, V92003		1
3	NAS679A6		. NUT		1
4	AN960PD616		. WASHER		1
5	BACB10AP6		. BEARING (REPLS MKP6AE6531)		1
6	66-22762-2		. SPACER		1
7	NAS334CPA32		. BOLT		1
8	66-22727-2		. BOLT		1
9	69-35566-3		. CRANK ASSY, RUDDER PCU VALVE INPUT (REPLS 69-35566-1, SB 27-1064)		1
9	69-35566-1		. CRANK ASSY, RUDDER PCU VALVE INPUT (REPLD BY 69-35566-3, SB 27-1064)		1
10	69-35601-1		. . CRANK, SECONDARY		1
11	69-35601-2		. . CRANK, PRIMARY		1
12	BACB10AP6		. . BEARING (REPLS MKP6AE6531)		1
13	NAS1080-6		. . COLLAR		1
14	BACB30GW6-16		. . BOLT		1
15	69-35566-2		. . LEVER ASSY (USED ON 69-35566-1)		1
15	69-35566-4		. . LEVER ASSY (USED ON 69-35566-3)		1
16	66-22725-2		. . . SLEEVE		1
17	68169		. . . WASHER, V92003		1
18	69-35598-1		. . . LEVER, SECONDARY (USED ON 69-35566-2)		1
18	69-35598-2		. . . LEVER, SECONDARY (USED ON 69-35566-4)		1
19	69-35568-1		. . . LEVER, PRIMARY (USED ON 69-35566-2)		1
19	69-35568-2		. . . LEVER, PRIMARY (USED ON 69-35566-4)		1
20	HL73-8		. COLLAR, V73197		1
21	68093		. WASHER, V92003		1
22	NAS679A6		. NUT		1
23	AN960PD616		. WASHER		1
24	BACB30LU4-58		. BOLT (REPLS NAS334CPA40)		1
25	66-22727-1		. BOLT		1
26	BACB10AP6		. BEARING (REPLS MKP6AE6531)		1
27	66-22762-1		. SPACER		1
28	69-35567-1		. LEVER ASSY, SUMMING, RUDDER PCU		1
29	MKSP5E9104A		. . BEARING, V21335		1
29	BACB10AR5		. . BEARING (REPLS MKSP5E9104)(OPT)		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1105-					
30	BACB10AP6		. . BEARING (REPLS MKP6AE6531)		1
31	BACB10AP5		. . BEARING (REPLS MKP5AE6531)		2
32	NAS1080C6		. . COLLAR		5
33	BACB30GW6-31		. . BOLT		5
33	BACB30GW6-30		. . BOLT (OPT)		5
34	69-35567-2		. . SUB ASSY		1
35	66-22725-1		. . . SLEEVE		1
36	68169		. . . WASHER, V92003		5
37	69-35567-3		. . . SUB ASSY (LH)		1
37	69-35567-4		. . . SUB ASSY (RH)		1
38	69-35565-1		. . . . SEGMENT (USED ON 69-35567-3)		1
39	69-35565-2		. . . . SEGMENT (USED ON 69-35567-4)		1
40	66-22726-1		. . . . SIDE PLATE		1
41	69-35563-1		. LINK ASSY, VALVE, RUDDER PCU		1
42	BACC30K6		. . COLLAR		3
42	6LC-C6		. . COLLAR (OPT)		3
43	BACB30GW6-5		. . BOLT		3
43	BACB30GW6-4		. . BOLT (OPT TO BACB30GW6-5)		3
43	SALP-T6-4		. . BOLT (OPT TO BACB30GW6-4)		3
44	68169		. . WASHER, V82106		3
45	69-35564-1		. . SEGMENT		2

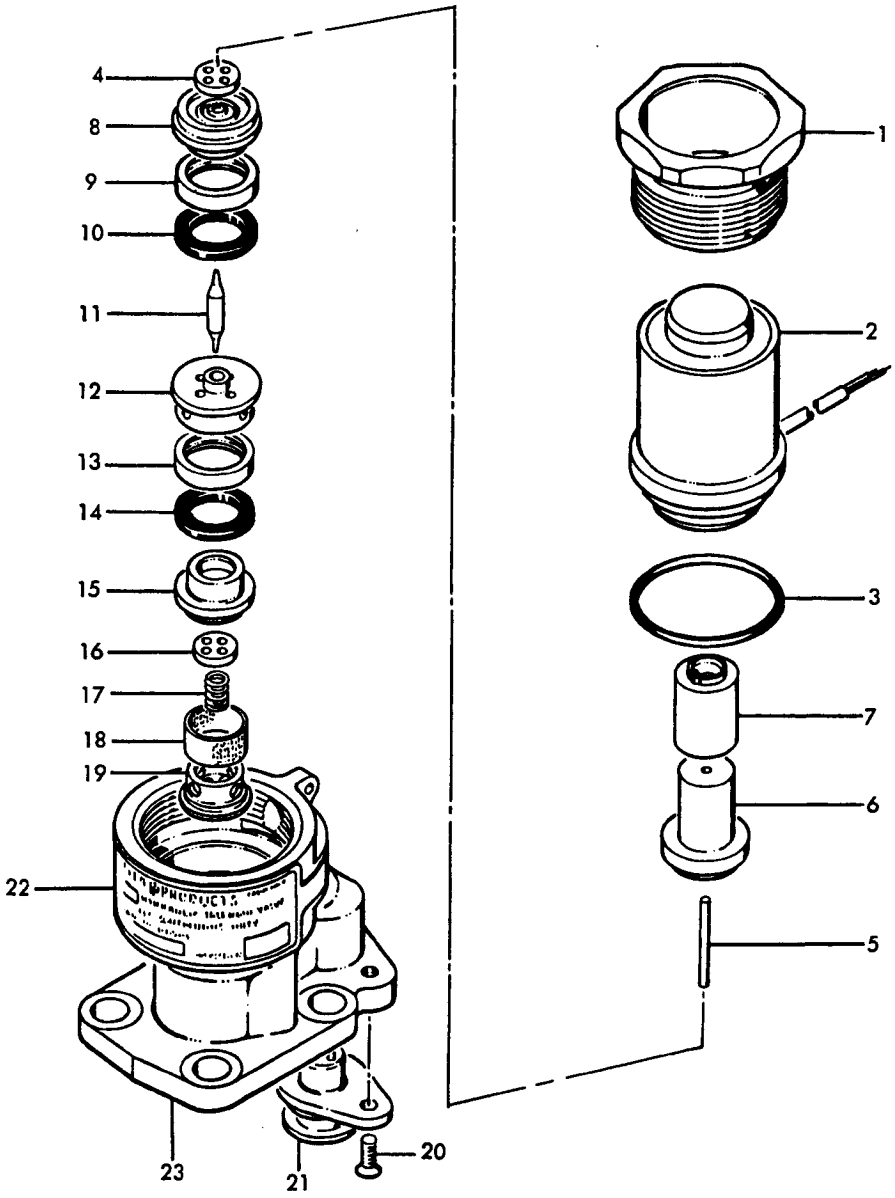


Aft Manifold Buildup
Figure 1106

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1106-	NO ASSIGNED P/N		AFT MANIFOLD BUILDUP		RF
1	69-35625-1		. CAP		1
2	NAS1611-215		. PACKING		1
3	69-35649-1		. WALKING BEAM ASSY		1
4	66-22729-1		. . RETAINER, SPLIT		2
5	66-22754-1		. . GUIDE, SPRING		1
6	66-22830-1		. . SPRING		1
7	69-35608-1		. . SEAT, CAM		1
8	66-22753-1		. . PIN		1
9	69-35605-1		. . SEGMENT		1
10	69-35607-1		. . SEGMENT, CAM		1
11	69-35613-1		. . FORK, CENTERING		1
12	NAS1611-223		. PACKING		1
13	69-35618-1		. CAP, INPUT CRANK ACCESS		1
14	NAS1611-233		. PACKING		1
15	S12766-233		. RING, BACKUP, V97820		2
15	BACR12BM233		. RING, BACKUP (OPT)		2
16	NAS1080-8		. COLLAR, SWAGE LOCKING		1
17	NAS1611-112		. PACKING		1
18	69-35602-1		. LEVER ASSY		1
19	MKP4A		. . BEARING, V21335		1
20	69-35602-2		. . LEVER		1
21	66-22749-1		. BOLT *[3] (PRE SB 27A1202R2, 27A1202R3)		1
21	66-22749-2		. BOLT *[4] (POST SB 27A1202R2, 27A1202R3)		1
22	69-35603-1		. LEVER ASSY		1
23	MB538E9595		. . BEARING, V21335		1
23	MB538DDE9595		. . BEARING (OPT), V21335		1
23	MB538FS428		. . BEARING (OPT), V21335		1
23	MB538DDFS428		. . BEARING (OPT), V21335		1
24	60163		. . RIVET, V92003		1
25	60164		. . ROLLER, V92003		1
26	69-35604-1		. . LEVER		1
27	MB541		. BEARING, V21335		1
28	S12560-213		. SEAL, CHANNEL, V97820		1
29	NAS1611-213		. PACKING		1
30	66-22730-1		. SPACER		1
31	MB540DD-E6531		. BEARING, V21335		1
32	69-35614-1		. CAP		1
33	NAS1611-114		. PACKING		1
34	66-22758-1		. SPRING		1
35	66-22760-1		. PIN		1
36	66-22825-1		. GUIDE		1
37	66-22756-1		. SPRING		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1106-					
38	69-35606-1		. GUIDE, SPRING		1
39	68053		. NUT, RETAINING, V92003		1
40	68010-5003		. VALVE ASSY, DUAL SERVO, V92003 (FIG. 1108) *[1] (PRE SB 27A1202R2, 27A1202R3)		1
40	68010-5005		. VALVE ASSY, DUAL SERVO, V92003 (FIG. 1108)(OPT) *[2] (PRE SB 27A1202R2, 27A1202R3)		1
40	68010-5007		. VALVE ASSY, DUAL SERVO, V92003 (FIG. 1108)(OPT) *[2] (PRE SB 27A1202R2, 27A1202R3)		1
40	398310-1001		. VALVE ASSY, DUAL SERVO, V92003 (FIG. 1108) *[5] (POST SB 27A1202R2, 27A1202R3)		1
40	398310-1003		. VALVE ASSY, DUAL SERVO, V92003 (FIG. 1108) *[6] (POST SB 27A1202R3)		1
41	NAS1611-118		. PACKING		1
42	NAS1611-011		. PACKING		4

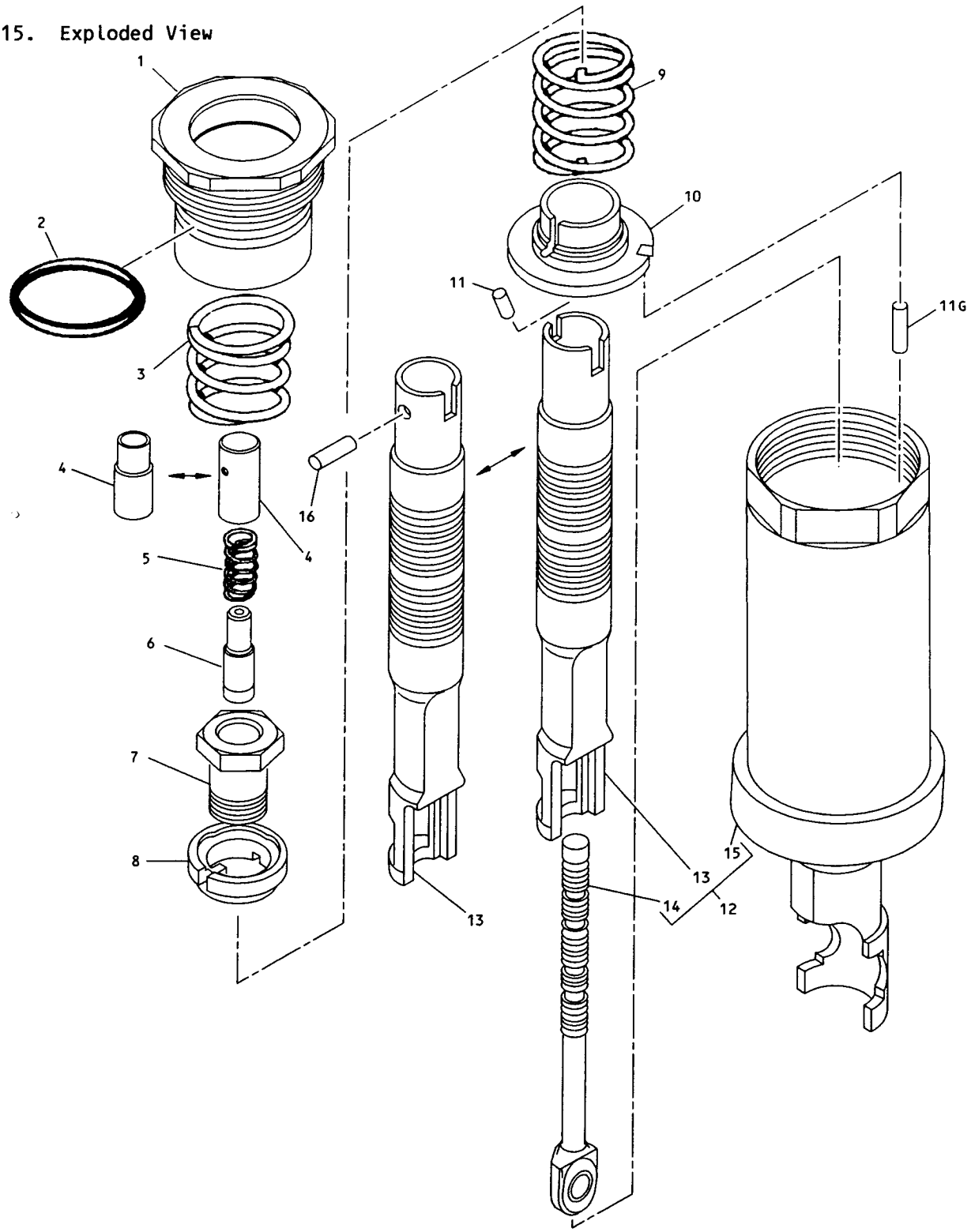
*[1] USED ON 65-44861-2 THRU -10 ONLY.
*[2] USED ON 65-44861-11, USED ON 65C37052-2 THRU -10 PER SB 27-1185 AND SB 27-1185R1.
*[3] USED ON 65-44861-2 THRU -11, 65C37052-2 THRU -10 ONLY.
*[4] USED ON 65-44861-12; USED ON 65C37053-2 THRU -10 PER SB 27A1202R2 AND 27A1202R3.
*[5] USED ON 65-44861-12 (OPT TO 398310-1003).
*[6] USED ON 65-44861-12 (PREFERRED TO 398310-1001); USED ON 65C37053-2 THRU -10 PER SB 27A1202R3.



Hydraulic Solenoid Control Valve Assembly
Figure 1107

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1107	59600-5003		CONTROL VALVE ASSY, HYDRAULIC SOLENOID, V92003 (BOEING 10-60811-1)		RF
1	59608		. NUT, V92003		1
2	59611-3		. COIL ASSY, V92003		1
3	NAS1611-213		. PACKING, O-RING		1
4	18310		. SLUG, V92003		1
5	14010-3		. PIN, V92003		1
6	59609		. POLE, V92003		1
7	12040		. ARMATURE, V92003		1
8	59604-3		. SEAT, V92003		1
9	BACR12AS112		. RING, CAP		1
10	BACP11W112		. PACKING, SQUARE RING		1
11	59606		. PIN, V92003		1
12	59603		. GUIDE, PIN, V92003		1
13	BACR12AS111		. RING, CAP		1
14	BACP11W111		. PACKING, SQUARE RING		1
15	59602-3		. SEAT, V92003		1
16	18310		. SLUG, V92003		1
17	59614		. SPRING, V92003		1
18	59615		. SCREEN, V92003		1
19	59605		. RETAINER, V92003		1
20	AN507C632R6		. SCREW, MACHINE		2
21	000101-0172		. RECEPTACLE ASSY, V05574		1
22	59610		. NAMEPLATE, V92003		1
23	59601		. BODY, V92003		1

15. Exploded View



Dual Servo Valve Assembly
Figure 1108

G79420

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1108-					
	68010-5003		DUAL SERVO VALVE ASSY, V92003 *[1]*[3]	A	RF
	68010-5005		DUAL SERVO VALVE ASSY, V92003 *[2]*[3]	B	RF
	68010-5007		DUAL SERVO VALVE ASSY, V92003 *[2]*[3]	C	RF
	398310-1001		DUAL SERVO VALVE ASSY, V92003 *[3]*[4]	D	RF
	398310-1003		DUAL SERVO VALVE ASSY, V92003 *[3]*[6]	E	RF
1	83344		. CAP, MAIN, V92003	A-C	1
1	381519-1		. CAP, MAIN, V92003	DE	1
2	NAS1611-218		. PACKING, O-RING		1
3	83347-3		. SPRING, OUTER, V92003	A-C	1
3	83347		. SPRING, OUTER, V92003 (OPT)	A	1
3	381517-1		. SPRING, OUTER, V92003	DE	1
4	68170		. PIN, STOP, V92003	A-C	1
4	381503-1		. GUIDE, BIAS SPRING, OUTER V92003	DE	1
5	68173		. SPRING, VALVE BIAS, V92003		1
6	68171		. GUIDE, SPRING, V92003	A-C	1
6	381502-1		. GUIDE, BIAS SPRING, INNER V92003	D	1
6	381502-3		. GUIDE, BIAS SPRING, INNER V92003	E	1
7	68021		. RETAINER, SPRING, V92003	A	1
7	68021-5		. RETAINER, SPRING, V92003	BC	1
8	68045		. GUIDE, SINGLE SPRING, V92003	A	1
8	68045-5		. GUIDE, SINGLE SPRING, V92003 (PREF)	B	1
8	68045-3		. GUIDE, SINGLE SPRING, V92003 (OPT)	B	1
8	83345-1		. GUIDE, SINGLE SPRING, V92003	C	1
8	381515-1		. GUIDE, SINGLE SPRING, V92003	DE	1
9	83348		. SPRING, INNER, V92003	A-C	1
9	381518-1		. SPRING, INNER, V92003	DE	1
10	68046-1		. GUIDE, DOUBLE SPRING, V92003	A	1
10	68046-7		. GUIDE, DOUBLE SPRING, V92003 (PREF)	B	1
10	68046-5		. GUIDE, DOUBLE SPRING, V92003 (OPT)	B	1
10	83346-1		. GUIDE, DOUBLE SPRING, V92003	C	1
10	381516-1		. GUIDE, DUAL SPRING, V92003	DE	1
11	NAS607-2-4		. PIN	A-C	1
11G	MS16556-602		. PIN *[5]	DE	1
12	68010-11		. LAP ASSY, V92003	AB	1
12	68010-17		. LAP ASSY, V92003	C	1
12	398310-101		. LAP ASSY, V92003	DE	1
13	68010-15		. . INSERT ASSY, PRIMARY, V92003	AB	1
13	68010-21		. . INSERT ASSY, PRIMARY, V92003	C	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1108-					
13	398313-1		. . SLIDE, SECONDARY, V92003	DE	1
14	83349		. . SLIDE, PRIMARY, V92003	A-C	1
14	381512-1		. . SLIDE, PRIMARY, V92003	DE	1
15	68010-13		. . INSERT ASSY, SECONDARY, V92003	AB	1
15	68010-19		. . INSERT ASSY, SECONDARY, V92003	C	1
15	398310-11		. . BODY ASSY, V92003	DE	1
16	MS51838-28		. PIN	DE	1

*[1] USED ON 65-44861-2 THRU -10 ONLY.
*[2] USED ON 65-44861-11, USED ON 65C37052-2 THRU -10 PER SB 27-1185 AND SB 27-1185R1.
*[3] SERIALIZED MATCH OR TRIMMED COMPONENTS OF THESE ASSEMBLIES SHALL NOT BE INTERCHANGED.
*[4] USED ON 65-44861-12 (OPTIONAL TO 398310-1003).
*[5] INCLUDED AS A COMPONENT OF ITEM 15 BODY ASSEMBLY FOR THE 398310-1001, -1003 DUAL SERVO VALVE ASSEMBLIES.
*[6] USED ON 65-44861-12 (PREFERRED TO 398310-1001). USED ON 65C37053-2 THRU -10 PER SB 27A1202R3.

17. Exploded View

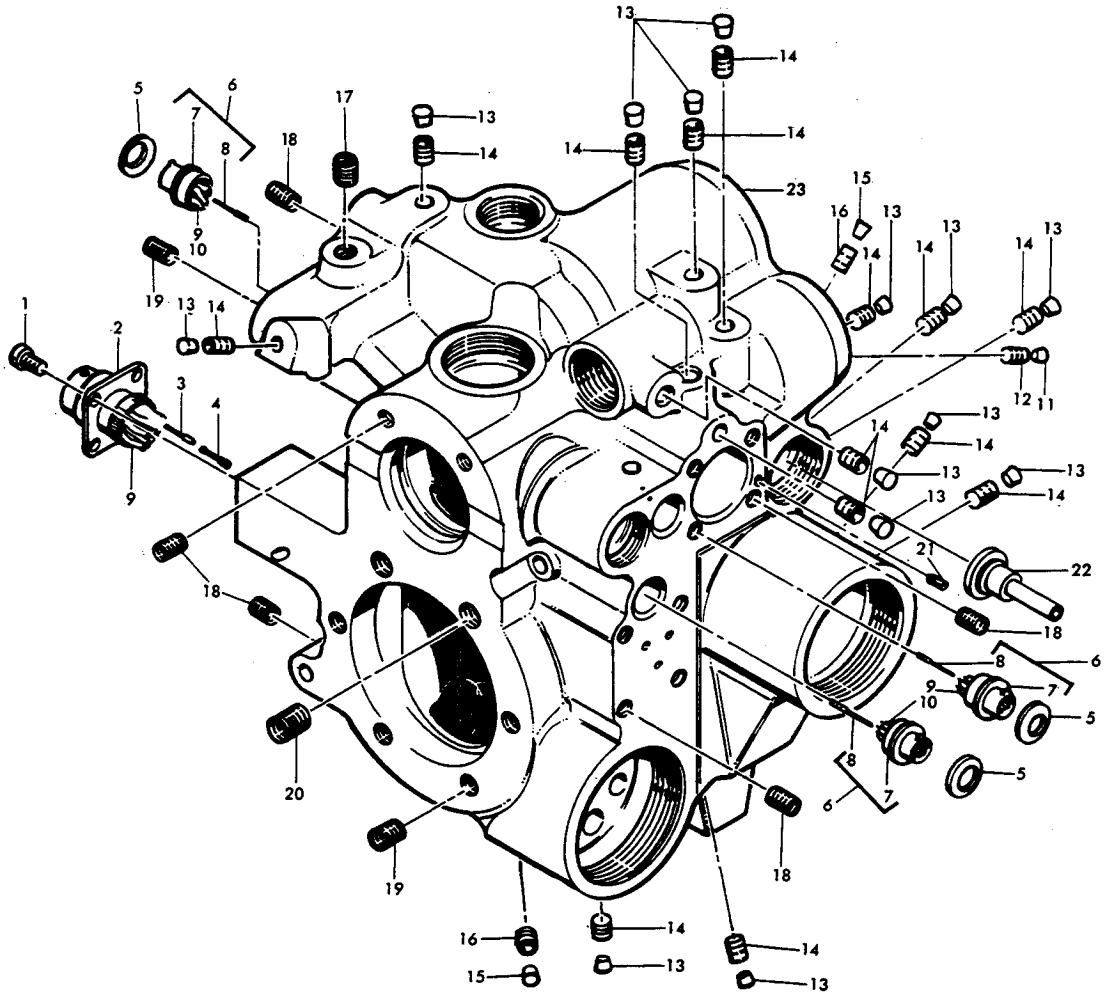


FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1109-					
	65-44862-14		AFT MANIFOLD ASSY	A	RF
	65-44862-15		AFT MANIFOLD ASSY	B	RF
	65-44862-16		AFT MANIFOLD ASSY	C	RF
1	AN500AD4-4		. SCREW, MACHINE		4
2	BACC45FN12-12P6		. RECEPTACLE (REPLS 48-10R12-12P6 (120)		1
2	48-10R12-12P6 (120)		. RECEPTACLE, V07497 (REPLD BY BACC45FN12-12P6)		1
3	BACC47CN1		. PIN, CONTACT		12
3	48-2335-02		. PIN, CONTACT, V07497, (OPT TO BACC47CN1)		12
4	48-2221-20		. PLUG, SEALING, V07497		1
5	59140		. RETAINER, V92003		3
6	000100-0113		. PLUG ASSY, V05574		3
7	102-0010-000		. . SHELL, PLUG, V05574		1
8	019-0039-000		. . PIN, CONTACT, V05574		4
9	65-44862-2		. WIRE, WHITE, BROWN, BLACK		1
9	65-44862-3		. WIRE, WHITE, BROWN		1
9	65-44862-4		. WIRE, WHITE, BROWN, ORANGE		1
9	65-44862-5		. WIRE, WHITE, BROWN, RED, RED		1
9	65-44862-6		. WIRE, WHITE, BROWN, YELLOW, YELLOW		1
9	65-44862-7		. WIRE, WHITE, BROWN, GREEN, GREEN		1
9	65-44862-8		. WIRE, WHITE, BROWN, BLUE, BLUE		1
9	65-44862-9		. WIRE, WHITE, BROWN, GREEN		1
9	65-44862-10		. WIRE, WHITE, BROWN, BLUE		1
9	65-44862-11		. WIRE, WHITE, BROWN, YELLOW		1
9	65-44862-12		. WIRE, WHITE, BROWN, RED		1
10	65-44862-13		. TUBING		11
11	BACP20AX12DP		. PIN		1
12	BACP20AX12D		. PLUG		1
13	BACP20AX18DP		. PIN		14
14	BACP20AX18D		. PLUG		14
15	BACP20AX18DAP		. PIN		2
16	BACP20AX18DA		. PLUG		2
17	MS21209F1-15		. INSERT, THREAD		1
18	MS21209F4-15		. INSERT, THREAD		15
19	MS21209F5-15		. INSERT, THREAD		8
20	MS21209F6-15		. INSERT, THREAD		2
21	MS21209C0615		. INSERT, THREAD		1
22	69-35967-2		. STOP		1
23	65-44863-1		. MANIFOLD	A	1

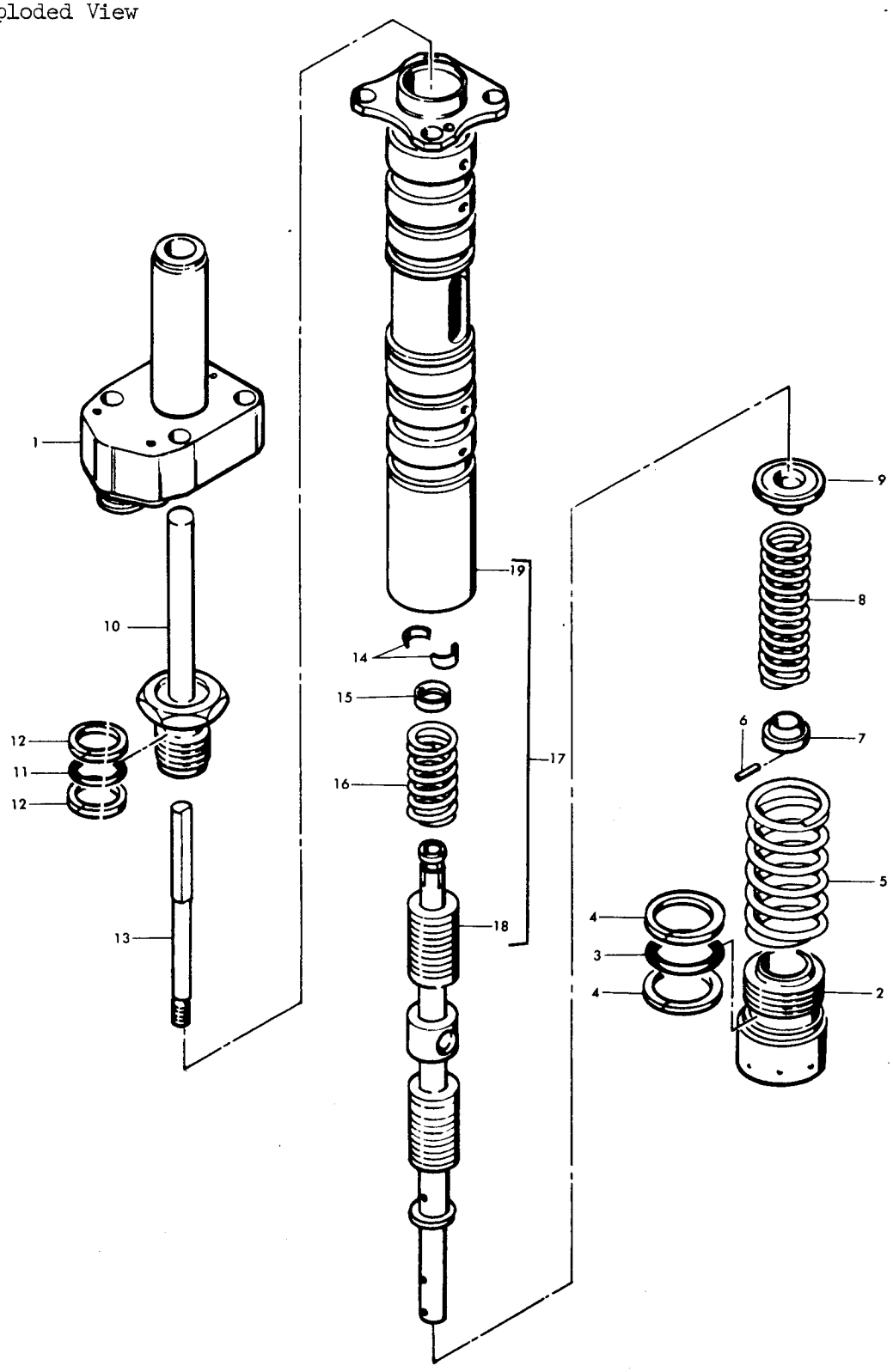
FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1109-					
23	65-44863-5		. MANIFOLD	B	1
23	65-44863-4		. MANIFOLD (OPT)	B	1
23	65-44863-8		. MANIFOLD (OPT)	B	1
23	65-44863-10		. MANIFOLD	C	1
23	242622-1		. MANIFOLD (0.015 OVERSIZE ANODIZED BORE), V82106 *[1]		1
23	242622-3		. MANIFOLD (0.030 OVERSIZE ANODIZED BORE), V82106 *[2]		1
23	242622RW1		. MANIFOLD (STD SIZE CHROME PLATED BORE), V82106 (REPAIR PART)		1
23	242622RW1-1		. MANIFOLD (0.015 OVERSIZE CHROME PLATED BORE), V82106 *[1]		1
23	242622RW1-3		. MANIFOLD (0.030 OVERSIZE CHROME PLATED BORE), V82106 *[2]		1
23	65C30874-3		. MANIFOLD *[3]		1

*[1] REPAIR PART USED WITH 0.015 OVERSIZE PARTS (REF ITEMS 34, 35, FIG. 1103)

*[2] REPAIR PART USED WITH 0.030 OVERSIZE PARTS (REF ITEMS 34, 35, FIG. 1103)

*[3] REPAIR PART USED WITH 65C30874-4 SLEEVE

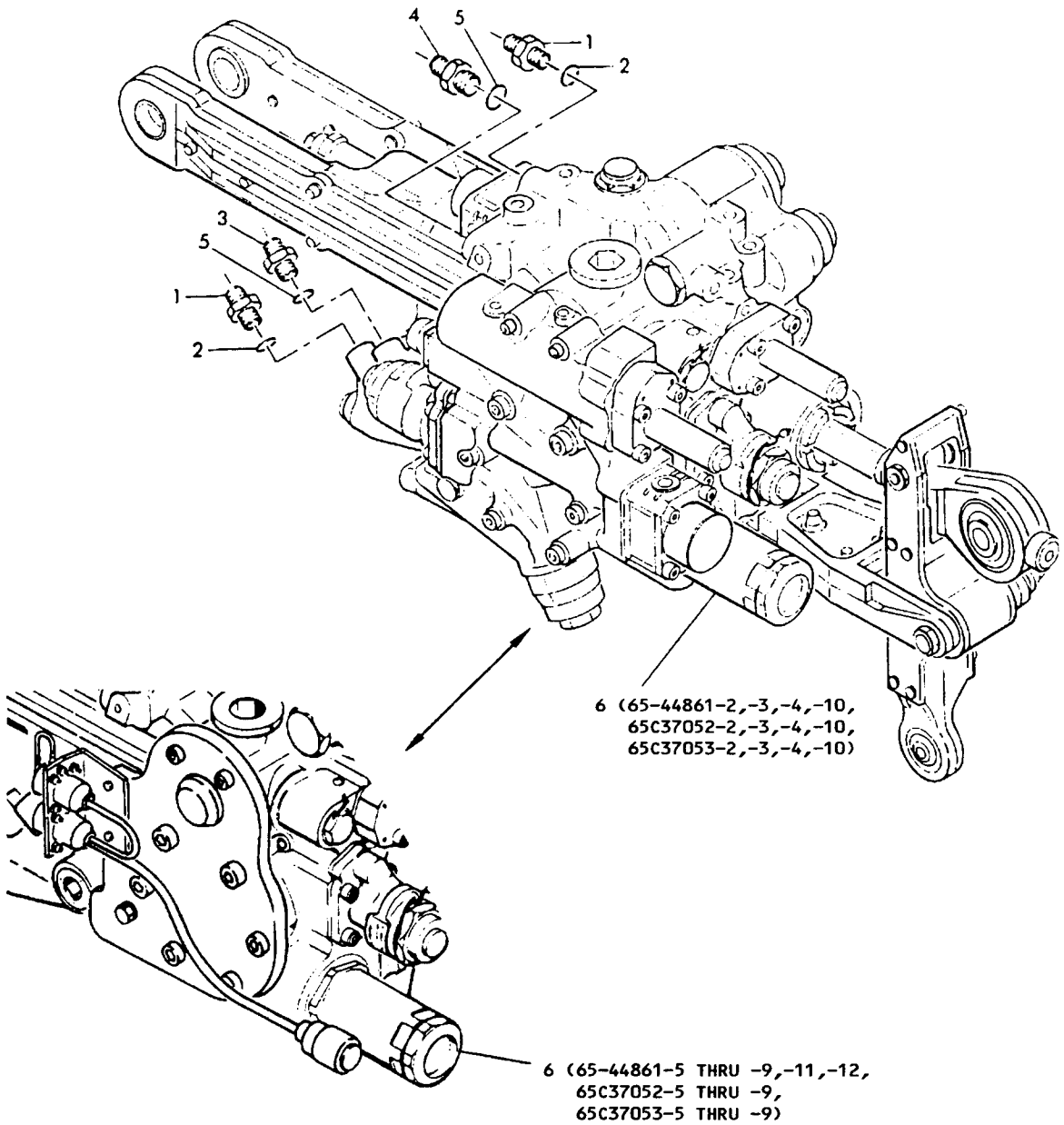
19. Exploded View



Yaw Damper Actuator Assembly
Figure 1110

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1110-					
	69-35609-1		ACTUATOR ASSY, RUDDER PCU YAW DAMPER	A	RF
	69-35609-3		ACTUATOR ASSY, RUDDER PCU YAW DAMPER (SB 27-1063)	B	RF
	69-35609-5		ACTUATOR ASSY, RUDDER PCU YAW DAMPER	C	RF
	69-35609-6		ACTUATOR ASSY, RUDDER PCU YAW DAMPER	D	RF
1	GM1032-3 *[1]		. TRANSFORMER, LINEAR POSITION TRANSDUCER, V22863 (BOEING 10-60810-3)		1
2	59123		. CAP, V92003 (PRE SB 27-1145)	A	1
2	59174-1		. CAP, V92003 (PRE SB 27-1145)	B	1
2	59174-3		. CAP, V92003 (PRE SB 27-1145)	C	1
2	59174-5		. CAP, V92003 (POST SB 27-1145)		1
3	NAS1611-211		. PACKING		1
4	S12766-211		. RING, BACKUP, V97820		2
5	66-22755-1		. SPRING, OUTER		1
6	59126		. PIN, V92003		1
7	59125		. RETAINER, V92003		1
8	66-22761-1		. SPRING, INNER		1
9	59124		. RETAINER, V92003		1
10	59157		. DIAPHRAGM, V92003 (PRE SB 27-1145)	A	1
10	59188-1		. DIAPHRAGM, V92003 (PRE SB 27-1145)	B	1
10	59188-3		. DIAPHRAGM, V92003 (POST SB 27-1145)		1
11	NAS1611-114		. PACKING		1
12	S12766-114		. RING, BACKUP, V97820		2
13	GM1032-2 *[1]		. PROBE, LINEAR POSITION TRANSDUCER, V22863 (BOEING 10-60810-2)		1
14	59138		. RING, SPLIT, V92003		2
15	59137		. RING, OUTER COLLET, V92003		1
16	59134		. SPRING, V92003		1
17	69-35609-2		. LAP ASSY		1
18	69-35612-1		. . PISTON		1
19	69-35611-1		. . SLEEVE		1

*[1] GM1032-2 AND GM1032-3 MAKE UP GM1032, (BOEING 10-60810-1) TRANSDUCER ASSEMBLY.



Rudder Power Control Unit Assembly
Figure 1111

G79043

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1111-					
	65-45160-3		UNIT ASSY, RUD POWER CONT *[1]	A	RF
	65-45160-4		UNIT ASSY, RUD POWER CONT (SB 27-1063) *[1]	B	RF
	65-45160-5		UNIT ASSY, RUD POWER CONT *[1]	C	RF
	65-45160-6		UNIT ASSY, RUD POWER CONT *[1]	D	RF
	65-45160-8		UNIT ASSY, RUD POWER CONT *[1]	E	RF
	65-45160-12		UNIT ASSY, RUD POWER CONT *[1]	F	RF
	65-45160-13		UNIT ASSY, RUD POWER CONT *[1]	G	RF
	65-45160-15		UNIT ASSY, RUD POWER CONT *[1]	J	RF
	65-45160-17		UNIT ASSY, RUD POWER CONT *[1]	I	RF
	65-45160-19		UNIT ASSY, RUD POWER CONT *[1]	H	RF
	65-45160-21		UNIT ASSY, RUD POWER CONT *[1]	K	RF
1	MS21902-4		. UNION		2
2	NAS1612-4		. PACKING, O-RING		2
3	MS21902D6		. UNION		1
4	MS21916D6-5		. REDUCER		1
5	NAS1612-6		. PACKING, O-RING		2
6	65-44861-2		. UNIT ASSY, RUD POWER CONT (PRE SB 27-1185) (PRE SB 27-1091) (PRE SB 27A1202R2, 27A1202R3)	A	1
6	65-44861-3		. UNIT ASSY, RUD POWER CONT (PRE SB 27-1185) (PRE SB 27-1091) (PRE SB 27A1202R2, 27A1202R3)	B	1
6	65-44861-4		. UNIT ASSY, RUD POWER CONT (PRE SB 27-1185) (PRE SB 27-1091) (PRE SB 27A1202R2, 27A1202R3)	C	1
6	65-44861-5		. UNIT ASSY, RUD POWER CONT (PRE SB 27-1127) (POST SB 27-1091) (PRE SB 27-1185) (PRE SB 22-1069) (PRE SB 22-1074) (PRE SB 27A1202R2, 27A1202R3)	D	1
6	65-44861-6		. UNIT ASSY, RUD POWER CONT (POST SB 22-1169) (PRE SB 27-1185) (PRE SB 27-1127) (POST SB 22-1074) (PRE SB 27A1202R2, 27A1202R3)	E	1
6	65-44861-7		. UNIT ASSY, RUD POWER CONT (POST SB 27-1174) (PRE SB 27-1185) (POST SB 22-1074) (POST SB 27-1127) (PRE SB 27A1202R2, 27A1202R3)	F	1
6	65-44861-8		. UNIT ASSY, RUD POWER CONT (PRE SB 22-1074) (PRE SB 27-1174R1) (POST SB 27-1127) (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	I	1
6	65-44861-9		. UNIT ASSY, RUD POWER CONT (PRE SB 27-1185) (POST SB 27-1145) (POST SB 27-1145R1) (PRE SB 27A1202R2, 27A1202R3)	G	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1111-6	65-44861-10		. UNIT ASSY, RUD POWER CONT (PRE SB 27-1185R1) (PRE SB 27A1202R2, 27A1202R3)	J	1
6	65-44861-11		. UNIT ASSY, RUD POWER CONT (PRE SB 27A1202R2, 27A1202R3)	H	1
6	65-44861-12		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	H	1
6	65-44861-12		. UNIT ASSY, RUD POWER CONT	K	1
6	65C37052-2		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	A	1
6	65C37052-3		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	B	1
6	65C37052-4		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	C	1
6	65C37052-5		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	D	1
6	65C37052-6		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	E	1
6	65C37052-7		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	F	1
6	65C37052-8		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	I	1
6	65C37052-9		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185) (PRE SB 27A1202R2, 27A1202R3)	G	1
6	65C37052-10		. UNIT ASSY, RUD POWER CONT (POST SB 27-1185R1) (PRE SB 27A1202R2, 27A1202R3)	J	1
6	65C37053-2		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	A	1
6	65C37053-3		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	B	1
6	65C37053-4		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	C	1
6	65C37053-5		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	D	1
6	65C37053-6		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	E	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1111-					
6	65C37053-7		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	F	1
6	65C37053-8		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	I	1
6	65C37053-9		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	G	1
6	65C37053-10		. UNIT ASSY, RUD POWER CONT (POST SB 27A1202R2, 27A1202R3)	J	1

*[1] RUDDER PCU, P/N 65-45160-( ) HAS BEEN REPLACED WITH VENDOR PCU, P/N 419200-1003 (V92003) PER SB 27-1252 AND SB 27-1255

VENDORS

V00948	HUCK CO., INC., ONE GLENVIEW RD., MONTVALE, NEW JERSEY 07645
V02660	BUNKER RAMO, AMPHENOL NORTH AMERICAN DIV., 2801 S. 25TH AVE., BROADVIEW, ILLINOIS 60153
V05228	PUROLATOR, INC., AEROSPACE DIV., 950 RANCHO CONEJO BLVD, NEWBURY PARK, CALIFORNIA 91320
V05574	VIKING INDUSTRIES, INC., 21001 NORDHOFF, CHATSWORTH, CALIFORNIA 91311
V06090	RAYCHEM CORP., 300 CONSTITUTION DR., MENLO PK, CALIFORNIA 94025
V07497	AMPHENOL CORP., AMPHENOL CABLE DIV., 6235 S. HARLEM AVE., CHICAGO, ILLINOIS 60638
V14818	PUROFLOW CORP., 1631 10TH ST., SANTA MONICA, CALIFORNIA 90404
V18350	AIRCRAFT POROUS MEDIA, INC., 6301 49 ST. NORTH, PINELLAS PK., FLORIDA 33565
V21550	WINTEC CORP., 5223 W. IMPERIAL HIGHWAY, LOS ANGELES, CALIFORNIA 90045
V21335	FAFNIR BEARING CO., 37 BOOTH ST., NEW BRITAIN, CONNECTICUT 06050
V22863	KAVLICO ELECTRONICS, INC., 7842 BURNET AVE., VAN NUYS, CALIFORNIA
V72902	GREENE, TWEED AND CO., INC., 320 ELM AVE., NORTH WALES, PENNSYLVANIA 19454
V73197	HI-SHEAR CORP., 2600 WEST 247TH, TORRANCE, CALIFORNIA 90509
V75250	ABEX CORP., AEROSPACE DIV., 3151 W. 5TH ST., OXNARD, CALIFORNIA 93032
V77896	REXNORD INC., BEARING OPERATION, 2400 CURTIS STREET, DOWNERS GROVE, ILLINOIS 60515
V81873	TEXTRON INC., 25200 W. RYE CANYON RD., VALENCIA, CALIFORNIA 91355-1204
V92003	PARKER-HANNIFIN CORP., 18321 JAMBOREE BLVD., IRVINE, CALIFORNIA 92713
V94697	MOOG INCORPORATED, SENECA STREET AT JAMISON ROAD, EAST AURORA, NEW YORK 14052
V97820	W.S. SHAMBAN AND CO., 711 MITCHELL ROAD, NEWBURY PARK, CALIFORNIA 91320
V99643	STERER ENGINEERING AND MANUFACTURING CO., 4690 COLORADO BLVD., P.O. BOX 39787, GRIFFITH STATION, LOS ANGELES, CA 90039

Part No.	Fig. and Index No.	Qty. per Assy.
AC4638E-1	1101-37	2
AC4638E-1	1101-37	1
AC4638E11	1101-37	2
AC4638E11	1101-37	1
AC4638E3	1101-31	2
AC4638E31	1101-31	2
AC4638E31	1101-31	2
AC8818E1	1101-37	2
AC8818E1	1101-37	1
AC8818E2	1101-31	2
AN500AD4-4	1102-1	4
AN500AD4-4	1109-1	4
AN507C632R6	1107-20	2
AN960PD4	1102A-6	8
AN960PD416	1101-7	1
AN960PD416L	1101-15	2
AN960PD516	1101-5	4
AN960PD616	1101-3	2
AN960PD616	1105-4	1
AN960PD616	1105-23	1
A71882-1	1101-45	2
A71882-1	1101-45	1
BAC27DHY0269	1101-71	1
BAC27DHY0358	1101-71	1
BAC27DHY0390	1101-71	1
BAC27DHY6	1101-71	1
BACB10AP5	1105-31	2
BACB10AP6	1105-5	1
BACB10AP6	1105-12	1
BACB10AP6	1105-26	1
BACB10AP6	1105-30	1
BACB10AR5	1105-29	1
BACB10C94H	1103-23	1
BACB30FD5H20	1103-48	4
BACB30FM6-11	1104-8	8
BACB30FM8-55	1104-6	2
BACB30FM8-57	1103-47	2
BACB30GW6-16	1105-14	1
BACB30GW6-30	1105-33	5
BACB30GW6-31	1105-33	5
BACB30GW6-4	1105-43	3
BACB30GW6-5	1105-43	3
BACB30LU3-37	1101-20	1
BACB30LU4-58	1105-24	1
BACB30NF4-26	1101-6	1
BACC30K6	1105-42	3
BACC30M6	1104-7	8

Part No.	Fig. and Index No.	Qty. per Assy.
BACC30M8	1103-45	2
BACC30M8	1104-5	2
BACC45FN12 C12P	1102A-9A	1
BACC45FN12-12P6	1109-2	1
BACC45FN12C12P6	1102A-9	1
BACC45FT12C12S6	1102A-11	1
BACC47CN-1	1102-3	12
BACC47CN1	1102A-12	33
BACC47CN1	1109-3	12
BACN10BY510	1103-3	1
BACN10JC04	1102A-5	8
BACP11W111	1107-14	1
BACP11W112	1107-10	1
BACP20AX12D	1102-12	2
BACP20AX12D	1109-12	1
BACP20AX12DP	1102-11	2
BACP20AX12DP	1109-11	1
BACP20AX18D	1102-14	1
BACP20AX18D	1104-2	5
BACP20AX18D	1109-14	14
BACP20AX18DA	1109-16	2
BACP20AX18DAP	1109-15	2
BACP20AX18DP	1102-13	1
BACP20AX18DP	1104-1	5
BACP20AX18DP	1109-13	14
BACP20AX21D	1104-2A	1
BACP20AX21DP	1104-1A	1
BACR12AS111	1107-13	1
BACR12AS112	1107-9	1
BACR12BJ212A	1103-42	2
BACR12BM010	1101-12	8
BACR12BM010	1101-12	4
BACR12BM012	1101-39	4
BACR12BM012	1101-39	2
BACR12BM012	1101-70	4
BACR12BM113	1101-55	16
BACR12BM113	1101-65	4
BACR12BM115	1103-20	2
BACR12BM116	1101-33	4
BACR12BM116	1101-50	4
BACR12BM213	1101-26	16
BACR12BM213	1101-26	8
BACR12BM217	1101-36	4
BACR12BM217	1101-36	2
BACR12BM222	1101-30	4
BACR12BM223	1103-12	2
BACR12BM223	1103-32	2
BACR12BM223	1103-41	4

Part No.	Fig. and Index No.	Qty. per Assy.
BACR12BM233	1106-15	2
BACR15BA5D	1102A-17	2
BACS11A212A	1103-28	1
BACS11AA212A	1103-8	1
BACS11AA212A	1103-8	1
BACS11AA212A	1103-28	1
BACS12CB04-5	1102A-7	8
BACS34A7A	1103-6	1
BACS34A7A	1103-26	1
DAS10-31A1-505	1103-23	1
GM1032-2	1110-13	1
GM1032-3	1110-1	1
GTC5394C212	1103-8	1
GTC5394C212	1103-28	1
HL73-6	1101-17	1
HL73-8	1105-1	1
HL73-8	1105-20	1
M83723-60-212AC	1102A-4	1
MB538DDE9595	1106-23	1
MB538DDFS428	1106-23	1
MB538E9595	1106-23	1
MB538FS428	1106-23	1
MB540DD-E6531	1106-31	1
MB541	1106-27	1
MKP4A	1106-19	1
MKSP5E9104A	1105-29	1
MS16556-602	1108-11G	1
MS20002-10	1103-4	1
MS20002-6	1103-2	1
MS21042L4	1101-8	1
MS21042L4	1101-14	2
MS21209C0615	1109-21	1
MS21209F1-15	1102-15	1
MS21209F1-15	1109-17	1
MS21209F4-15	1102-16	12
MS21209F4-15	1109-18	15
MS21209F5-15	1109-19	8
MS21209F6-15	1109-20	2
MS21902-4	1111-1	2
MS21902D6	1111-3	1
MS21916D6-5	1111-4	1
MS27295-2	1102A-4	1
MS51838-28	1108-16	1

Part No.	Fig. and Index No.	Qty. per Assy.
NAS1080-6	1105-13	1
NAS1080-8	1106-16	1
NAS1080C6	1105-32	5
NAS1104-22	1101-6	1
NAS1104-26	1101-6	1
NAS1104-42	1101-6	1
NAS1351-02-4	1102A-3	1
NAS1351-3H6P	1101-2A	2
NAS1351-4H10P	1101-1	2
NAS1351-4H10P	1101-40	8
NAS1351-4H10P	1101-40	4
NAS1351-4H20P	1101-22	8
NAS1351-4H20P	1101-22	4
NAS1351-4H24P	1101-1	2
NAS1351-4H24P	1101-16	2
NAS1351-4H28P	1101-44	8
NAS1351-4H28P	1101-44	4
NAS1351-4H40P	1103-44	1
NAS1351-5H12P	1101-4	4
NAS1351-5H12P	1101-4	3
NAS1351-5H14P	1101-4A	1
NAS1351-5H32P	1101-4	4
NAS1351-6H14P	1101-2	2
NAS1351-6H28P	1101-2	2
NAS1611-010	1101-11	4
NAS1611-010	1101-11	2
NAS1611-011	1106-42	4
NAS1611-012	1101-38	2
NAS1611-012	1101-38	1
NAS1611-012	1101-69	2
NAS1611-112	1101-23	2
NAS1611-112	1101-23	1
NAS1611-112	1101-42	2
NAS1611-112	1101-42	1
NAS1611-112	1101-46	2
NAS1611-112	1101-46	1
NAS1611-112	1106-17	1
NAS1611-113	1101-54	8
NAS1611-113	1101-64	2
NAS1611-114	1106-33	1
NAS1611-114	1110-11	1
NAS1611-115	1103-19	1
NAS1611-116	1101-32	2
NAS1611-116	1101-49	2
NAS1611-118	1106-41	1
NAS1611-211	1110-3	1
NAS1611-212	1103-9	1

Part No.	Fig. and Index No.	Qty. per Assy.
NAS1611-212	1103-9	1
NAS1611-212	1103-29	1
NAS1611-212	1103-29	1
NAS1611-212	1103-43	2
NAS1611-213	1101-25	16
NAS1611-213	1101-25	8
NAS1611-213	1106-29	1
NAS1611-213	1107-3	1
NAS1611-215	1106-2	1
NAS1611-217	1101-35	2
NAS1611-217	1101-35	1
NAS1611-218	1108-2	1
NAS1611-222	1101-29	2
NAS1611-223	1103-11	1
NAS1611-223	1103-31	1
NAS1611-223	1103-40	2
NAS1611-223	1106-12	1
NAS1611-233	1106-14	1
NAS1612-10	1101-58	2
NAS1612-10	1101-67	2
NAS1612-4	1111-2	2
NAS1612-6	1111-5	2
NAS1715C4T	1101-2B	2
NAS334CPA32	1105-7	1
NAS516-1	1103-22	1
NAS607-2-4	1108-11	1
NAS6204-26	1101-6	1
NAS671-2	1102A-2	1
NAS679A4W	1101-8	1
NAS679A4W	1101-14	2
NAS679A5	1101-19	1
NAS679A6	1103-1	1
NAS679A6	1105-3	1
NAS679A6	1105-22	1
NAS77-4-31	1103-46	4
NO ASSIGNED P/N	1101-73	1
NO ASSIGNED P/N	1105	RF
NO ASSIGNED P/N	1106	RF
RT876	1102A-14	AR
SALP-T6-4	1105-43	3
S12560-213	1106-28	1
S12766-010	1101-12	8
S12766-010	1101-12	4
S12766-012	1101-39	4
S12766-012	1101-39	2
S12766-012	1101-70	4

Part No.	Fig. and Index No.	Qty. per Assy.
S12766-113	1101-55	16
S12766-113	1101-65	4
S12766-114	1110-12	2
S12766-115	1103-20	2
S12766-116	1101-33	4
S12766-116	1101-50	4
S12766-211	1110-4	2
S12766-213	1101-26	16
S12766-213	1101-26	8
S12766-217	1101-36	4
S12766-217	1101-36	2
S12766-222	1101-30	4
S12766-223	1103-12	2
S12766-223	1103-32	2
S12766-223	1103-41	4
S12766-233	1106-15	2
S242623-1	1103-34	1
S242623-3	1103-34	1
S242624-1	1103-14	1
S242624-3	1103-14	1
S33121-212H5	1103-8	1
S33121-212H5	1103-28	1
S34435-212H99	1103-42	2
S34435-212H99	1103-42	2
S34712-212H5	1103-42	2
000100-0113	1102-6	3
000100-0113	1109-6	3
000101-0172	1107-21	1
019-0039-000	1102-8	4
019-0039-000	1109-8	4
102-0010-000	1102-7	1
102-0010-000	1109-7	1
11-10106	1101-37	2
11-10106	1101-37	1
11-10107	1101-31	2
21-10033	1101-31	2
21-10034	1101-37	2
21-10034	1101-37	1
21-11176	1101-31	2
22280710-001	1101-45	2
22280710-001	1101-45	1
242615-15	1103-16	2
242615-15	1103-36	2
242615-17	1103-16	2
242615-17	1103-36	2

Part No.	Fig. and Index No.	Qty. per Assy.
242615-23	1103-17	1
242615-23	1103-37	1
242615-25	1103-17	1
242615-25	1103-37	1
242615-5	1103-15	1
242615-5	1103-35	1
242615-7	1103-15	1
242615-7	1103-35	1
242615-9	1103-18	1
242615-9	1103-38	1
242621-1	1104-11	1
242621-3	1104-11	1
242621RW1	1104-11	1
242621RW1-1	1104-11	1
242621RW1-3	1104-11	1
242622-1	1109-23	1
242622-3	1109-23	1
242622RW1	1109-23	1
242622RW1-1	1109-23	1
242622RW1-3	1109-23	1
381502-1	1108-6	1
381502-3	1108-6	1
381503-1	1108-4	1
381512-1	1108-14	1
381515-1	1108-8	1
381516-1	1108-10	1
381517-1	1108-3	1
381518-1	1108-9	1
381519-1	1108-1	1
398310-1001	1106-40	1
398310-1001	1108	RF
398310-1003	1106-40	1
398310-1003	1108	RF
398310-101	1108-12	1
398310-11	1108-15	1
398313-1	1108-13	1
4228-633	1101-31	2
4228-634	1101-37	2
4228-634	1101-37	1
4245-501	1101-37	2
4245-501	1101-37	1
4245-502	1101-31	2
4245-502	1101-31	2
45080	1101-41	2
45080	1101-41	1
45080-1	1101-41	2
45080-1	1101-41	1
48-10R12-12P (120)	1102-2	1
48-10R12-12P6 (120)	1109-2	1
48-2149	1102A-4	1
48-2221-20	1102-4	1
48-2221-20	1102A-13	3
48-2221-20	1109-4	1
48-2335-02	1102-3	12
48-2335-02	1109-3	12
59110	1101-66	2
59119	1101-34	2
59119	1101-34	1
59120	1101-28	2
59123	1110-2	1
59124	1110-9	1
59125	1110-7	1
59126	1110-6	1
59134	1110-16	1
59137	1110-15	1
59138	1110-14	2
59140	1102-5	3
59140	1109-5	3
59149	1101-57	2
59154	1101-24	2
59154	1101-24	1
59157	1110-10	1
59174-1	1110-2	1
59174-3	1110-2	1
59174-5	1110-2	1
59188-1	1110-10	1
59188-3	1110-10	1
59600-5003	1101-41	2
59600-5003	1101-41	1
59600-5003	1107	RF
59600-5007	1101-41	2
59600-5007	1101-41	1
59600-5011	1101-41	2
59600-5011	1101-41	1
59601	1107-23	1
59602-3	1107-15	1
59603	1107-12	1
59604-3	1107-8	1
59605	1107-19	1
59606	1107-11	1
59608	1107-1	1
59609	1107-6	1
59610	1107-22	1

Part No.	Fig. and Index No.	Qty. per Assy.
59611-3	1107-2	1
59614	1107-17	1
59615	1107-18	1
59800-5001	1101-68	2
6LC-C6	1105-42	3
60163	1106-24	1
60164	1106-25	1
60754-3	1101-48	2
62000-5003	1101-59	2
62001	1101-60	1
62003	1101-61	1
62004	1101-62	1
62005	1101-63	1
65-44583-10	1103-18	1
65-44583-10	1103-38	1
65-44583-15	1103-16	2
65-44583-15	1103-36	2
65-44583-16	1103-17	1
65-44583-16	1103-37	1
65-44583-3	1103-15	1
65-44583-3	1103-35	1
65-44861-10	1101	RF
65-44861-10	1111-6	1
65-44861-11	1101	RF
65-44861-11	1111-6	1
65-44861-12	1101	RF
65-44861-12	1111-6	1
65-44861-12	1111-6	1
65-44861-2	1101	RF
65-44861-2	1111-6	1
65-44861-3	1101	RF
65-44861-3	1111-6	1
65-44861-4	1101	RF
65-44861-4	1111-6	1
65-44861-5	1101	RF
65-44861-5	1111-6	1
65-44861-6	1101	RF
65-44861-6	1111-6	1
65-44861-7	1101	RF
65-44861-7	1111-6	1
65-44861-8	1101	RF
65-44861-8	1111-6	1
65-44861-9	1101	RF
65-44861-9	1111-6	1
65-44861-10	1101	RF
65-44861-11	1101	RF
65-44861-12	1101	RF

Part No.	Fig. and Index No.	Qty. per Assy.
65-44862-10	1109-9	1
65-44862-11	1109-9	1
65-44862-12	1109-9	1
65-44862-13	1109-10	11
65-44862-14	1103-54	1
65-44862-14	1109	RF
65-44862-15	1103-54	1
65-44862-15	1109	RF
65-44862-16	1103-54	1
65-44862-16	1109	RF
65-44862-2	1109-9	1
65-44862-3	1109-9	1
65-44862-4	1109-9	1
65-44862-5	1109-9	1
65-44862-6	1109-9	1
65-44862-7	1109-9	1
65-44862-8	1109-9	1
65-44862-9	1109-9	1
65-44863-1	1109-23	1
65-44863-10	1109-23	1
65-44863-4	1109-23	1
65-44863-5	1109-23	1
65-44863-8	1109-23	1
65-44864-2	1101-13	1
65-44864-2	1103	RF
65-44864-3	1101-13	1
65-44864-3	1101-13	1
65-44864-3	1103	RF
65-44864-4	1101-13	1
65-44864-4	1101-13	1
65-44864-4	1101-13	1
65-44864-4	1103	RF
65-44864-5	1101-13	1
65-44864-5	1101-13	1
65-44864-5	1103	RF
65-44865-10	1104-11	1
65-44865-11	1104-9	1
65-44865-12	1104	RF
65-44865-13	1104-11	1
65-44865-14	1104-9	1
65-44865-15	1104	RF
65-44865-17	1104-11	1
65-44865-18	1104-9	1
65-44865-19	1104	RF
65-44865-2	1104-11	1
65-44865-4	1104-9	1
65-44865-5	1104	RF
65-44865-6	1104-11	1

Part No.	Fig. and Index No.	Qty. per Assy.
65-44865-7	1104-9	1
65-44865-8	1104	RF
65-44866-1	1102-17	1
65-44867-1	1103-34	1
65-44868-1	1101-9	1
65-44868-1	1102	RF
65-44868-11	1102-9	1
65-44868-12	1102-9	1
65-44868-13	1102-10	1
65-44868-14	1102-9	1
65-44868-15	1102-9	1
65-44868-16	1102-9	1
65-44868-17	1102-9	1
65-44868-18	1102-9	1
65-44868-19	1102-9	1
65-44868-20	1102-9	1
65-44868-21	1102-9	1
65-44868-22	1102-9	1
65-45160-12	1111	RF
65-45160-13	1111	RF
65-45160-15	1111	RF
65-45160-17	1111	RF
65-45160-19	1111	RF
65-45160-21	1111	RF
65-45160-3	1111	RF
65-45160-4	1111	RF
65-45160-5	1111	RF
65-45160-6	1111	RF
65-45160-8	1111	RF
65C30874-1	1103-55	1
65C30874-2	1104-9	1
65C30874-3	1109-23	1
65C37052-10	1101	RF
65C37052-10	1111-6	1
65C37052-2	1101	RF
65C37052-2	1111-6	1
65C37052-3	1101	RF
65C37052-3	1111-6	1
65C37052-4	1101	RF
65C37052-4	1111-6	1
65C37052-5	1101	RF
65C37052-5	1111-6	1
65C37052-6	1101	RF
65C37052-6	1111-6	1
65C37052-7	1101	RF
65C37052-7	1111-6	1
65C37052-8	1101	RF
65C37052-8	1111-6	1

Part No.	Fig. and Index No.	Qty. per Assy.
65C37052-9	1101	RF
65C37052-9	1111-6	1
65C37053-10	1101	RF
65C37053-10	1111-6	1
65C37053-2	1101	RF
65C37053-2	1111-6	1
65C37053-3	1101	RF
65C37053-3	1111-6	1
65C37053-4	1101	RF
65C37053-4	1111-6	1
65C37053-5	1101	RF
65C37053-5	1111-6	1
65C37053-6	1101	RF
65C37053-6	1111-6	1
65C37053-7	1101	RF
65C37053-7	1111-6	1
65C37053-8	1101	RF
65C37053-8	1111-6	1
65C37053-9	1101	RF
65C37053-9	1111-6	1
65C37053-10	1101	RF
66-22531-1	1102A-18	1
66-22725-1	1105-35	1
66-22725-2	1105-16	1
66-22726-1	1105-40	1
66-22727-1	1105-25	1
66-22727-2	1105-8	1
66-22728-1	1101-21	1
66-22729-1	1106-4	2
66-22730-1	1106-30	1
66-22749-1	1106-21	1
66-22749-2	1106-21	1
66-22753-1	1106-8	1
66-22754-1	1106-5	1
66-22755-1	1110-5	1
66-22756-1	1106-37	1
66-22758-1	1106-34	1
66-22760-1	1106-35	1
66-22761-1	1110-8	1
66-22762-1	1105-27	1
66-22762-2	1105-6	1
66-22825-1	1106-36	1
66-22830-1	1106-6	1
68002	1101-10	2
68010-11	1108-12	1
68010-13	1108-15	1
68010-15	1108-13	1
68010-17	1108-12	1

Part No.	Fig. and Index No.	Qty. per Assy.
68010-19	1108-15	1
68010-21	1108-13	1
68010-5003	1106-40	1
68010-5003	1108	RF
68010-5005	1106-40	1
68010-5005	1108	RF
68010-5007	1106-40	1
68010-5007	1108	RF
68021	1108-7	1
68021-5	1108-7	1
68045	1108-8	1
68045-3	1108-8	1
68045-5	1108-8	1
68046-1	1108-10	1
68046-5	1108-10	1
68046-7	1108-10	1
68053	1106-39	1
68061-3	1101-51	2
68062	1101-56	2
68063	1101-52	1
68064	1101-53	1
68093	1105-2	1
68093	1105-21	1
68094	1101-18	1
68169	1105-17	1
68169	1105-36	5
68169	1105-44	3
68170	1108-4	1
68171	1108-6	1
68173	1108-5	1
69-20184-1	1101-43	2
69-20184-1	1101-43	1
69-20185-1	1101-47	2
69-20185-1	1101-47	1
69-35533-1	1103-10	1
69-35533-1	1103-30	1
69-35534-1	1103-7	1
69-35534-1	1103-27	1
69-35535-1	1103-21	1
69-35535-2	1103-24	1
69-35535-3	1103-21	1
69-35535-4	1103-24	1
69-35537-1	1103-13	1
69-35537-1	1103-33	1
69-35538-1	1104-3	2
69-35539-1	1103-14	1
69-35540-1	1103-5	1

Part No.	Fig. and Index No.	Qty. per Assy.
69-35540-1	1103-25	1
69-35561-1	1103-39	1
69-35562-1	1104-10	2
69-35563-1	1101-72B	1
69-35563-1	1105-41	1
69-35564-1	1105-45	2
69-35565-1	1105-38	1
69-35565-2	1105-39	1
69-35566-1	1101-72	1
69-35566-1	1105-9	1
69-35566-2	1105-15	1
69-35566-3	1101-72	1
69-35566-3	1101-72	1
69-35566-3	1105-9	1
69-35566-4	1105-15	1
69-35567-1	1101-72A	1
69-35567-1	1105-28	1
69-35567-2	1105-34	1
69-35567-3	1105-37	1
69-35567-4	1105-37	1
69-35568-1	1105-19	1
69-35568-2	1105-19	1
69-35598-1	1105-18	1
69-35598-2	1105-18	1
69-35601-1	1105-10	1
69-35601-2	1105-11	1
69-35602-1	1106-18	1
69-35602-2	1106-20	1
69-35603-1	1106-22	1
69-35604-1	1106-26	1
69-35605-1	1106-9	1
69-35606-1	1106-38	1
69-35607-1	1106-10	1
69-35608-1	1106-7	1
69-35609-1	1101-27	2
69-35609-1	1110	RF
69-35609-2	1110-17	1
69-35609-3	1101-27	2
69-35609-3	1101-27	1
69-35609-3	1101-27	1
69-35609-3	1110	RF
69-35609-5	1101-27	1
69-35609-5	1101-27	1
69-35609-5	1110	RF
69-35609-6	1101-27	2
69-35609-6	1101-27	1
69-35609-6	1101-27	2

Part No.	Fig. and Index No.	Qty. per Assy.
69-35609-6	1101-27	1
69-35609-6	1110	RF
69-35611-1	1110-19	1
69-35612-1	1110-18	1
69-35613-1	1106-11	1
69-35614-1	1106-32	1
69-35618-1	1106-13	1
69-35625-1	1106-1	1
69-35649-1	1106-3	1
69-35967-2	1104-4	1
69-35967-2	1109-22	1
69-54599-1	1101-68	2
69-54772-1	1101-9	1
69-54772-1	1102A	RF
69-54772-10	1102A-15	1
69-54772-11	1102A-15	1
69-54772-12	1102A-15	1
69-54772-13	1102A-16	1
69-54772-14	1102A-16	1
69-54772-15	1102A-16	1
69-54772-16	1102A-16	1
69-54772-17	1102A-16	1
69-54772-18	1102A-16	1
69-54772-19	1102A-16	1
69-54772-2	1102A-15	1
69-54772-20	1102A-16	1
69-54772-21	1102A-16	1
69-54772-22	1102A-16	1
69-54772-23	1102A-16	1
69-54772-24	1101-9	1
69-54772-24	1102A	RF
69-54772-3	1102A-15	1
69-54772-35	1102A-1	1
69-54772-36	1102A-13	AR
69-54772-4	1102A-15	1
69-54772-5	1102A-15	1
69-54772-6	1102A-15	1
69-54772-7	1102A-15	1
69-54772-8	1102A-15	1
69-54772-9	1102A-15	1
69-54773-1	1102A-19	1
69-54774-1	1101-9A	1
69-54774-2	1101-9C	1
69-54774-3	1101-9B	1
69-54775-1	1101-10	2
69-74727-1	1102A-20	1

Part No.	Fig. and Index No.	Qty. per Assy.
7212FT952T	1103-42	2
7217MT952T	1103-15	1
7217MT952T	1103-35	1
721M7MT952T	1103-15	1
721M7MT952T	1103-35	1
721P7MT952T	1103-15	1
721P7MT952T	1103-35	1
73016	1101-45	2
73016	1101-45	1
7500271	1101-37	2
7500271	1101-37	1
7500272	1101-31	2
7500272	1101-31	2
7500272	1101-37	2
7500272	1101-37	1
75130	1101-45	2
75130	1101-45	1
7553574	1101-37	2
7553574	1101-37	1
7553575	1101-31	2
83301	1101-71	1
83344	1108-1	1
83345-1	1108-8	1
83346-1	1108-10	1
83347	1108-3	1
83347-3	1108-3	1
83348	1108-9	1
83349	1108-14	1
881600-1001	1101-41	2
881600-1001	1101-41	1