TO: ALL HOLDERS OF AILERON AND ELEVATOR POWER CONTROL UNIT ASSEMBLY OVERHAUL MANUAL, 27-09-21

REVISION NO. 54, DATED JUL 1/09

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 the option to use Batco 8401 Type 2 grease					X	X							
Added optional 925E or 1100 Model X-Y recorder										X			

AILERON AND ELEVATOR POWER CONTROL UNIT ASSEMBLY

27-09-21

BOEING P/N 65-44761-8, -9, -10, -12, -14, thru -22
65-45180-2, -4, -5, -7, -8, -13, -18, -19, -22, -23, -27, -29 -30, -31, -34, -35
65-49874-15, -28, -29, -30, -32, -34, -37, -39, -40, -43, -44, -47 thru -50, -52, -54

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30651	May 15/68
		PRR 30847	Nov 15/68
		PRR 32293	Dec 25/73
		PRR 32337-1	Mar 25/75
		PRR 32698	Jul 5/77
		PRR 32698-1	Jul 5/77
	27-1		Jan 5/79
		PRR 32900-19	Jan 5/80
27-1115		PRR 33139	Jan 5/82
		PRR 33180-72	Dec 5/83
		PRR 33455	Dec 5/83
	27-33		Sep 1/97

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F Indicates foldout pages - print one side only

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	T-2	BLANK		406B	Sep 5/93		702	Dec 5/83
*	LEP-1	Jul 1/09		407	Jul 1/99		702A	Dec 5/89
*	LEP-2	Jul 1/09		408	Nov 1/99		702B	BLANK
	T/C-1	Dec 10/70		408A	Mar 5/93		703	Dec 5/89
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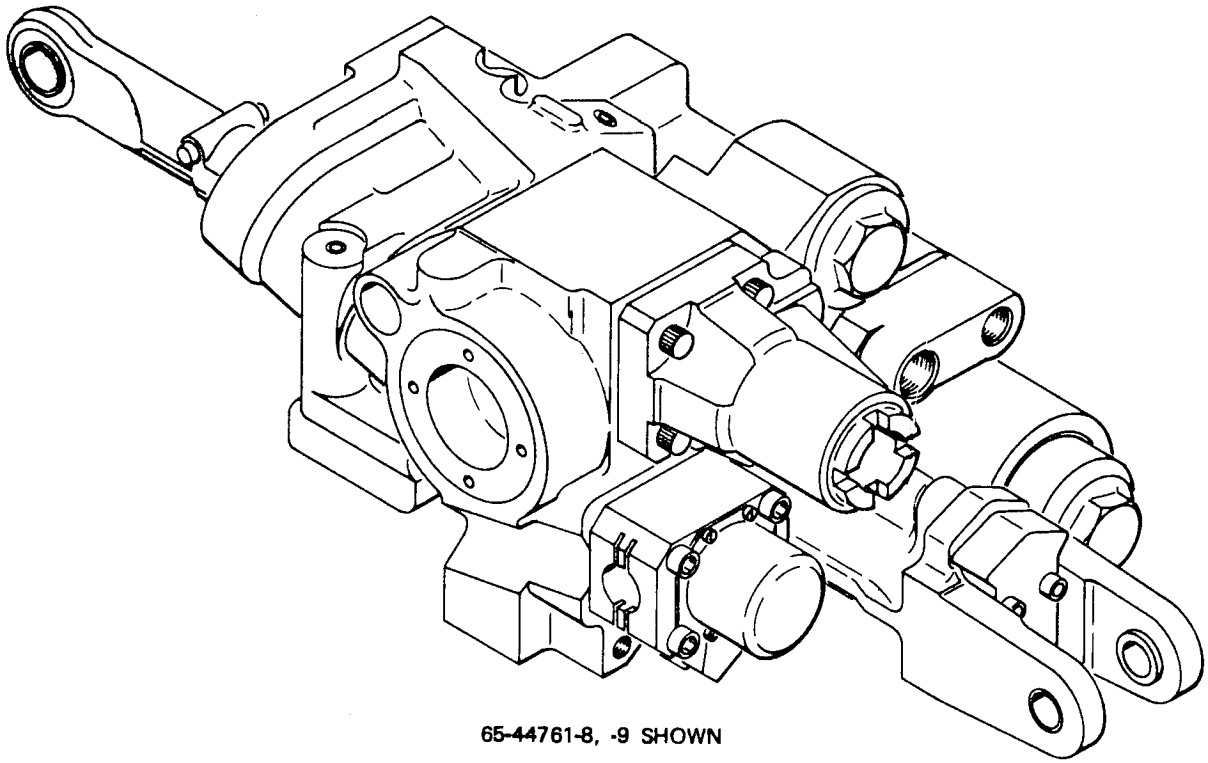
AILERON AND ELEVATOR POWER CONTROL UNIT ASSEMBLY



Aileron and Elevator Power Control Unit Assembly
Figure 1

DESCRIPTION AND OPERATION

1. The Aileron and Elevator Power Control Unit Assembly is composed of a manifold assembly, a main actuator, a bypass valve, filters, and a servo valve. Early configurations incorporated a hydraulic solenoid valve, an autopilot engage mechanism, a shutoff valve, an electrohydraulic servo valve, a linear transducer, a thermostatic control valve or flow control plug.

   A. The Power Control Units are used in pairs, one pair actuates the ailerons and one pair the elevators. One power control unit in each pair operates from hydraulic system A and the other from hydraulic system B.

B. Manual Control Mode

(1) An input rod from the pilot's control column linkage actuates the input arm assembly, input shaft assembly, and operates the servo valve assembly. Movement of the primary slide ports hydraulic fluid to one side of the actuator piston, and ports hydraulic fluid from the other side of the actuator piston to the hydraulic return system. The difference in pressure on the piston surfaces causes the actuator body to move.

(2) Actuator movement moves the input arm and shaft, and feedback brings the slide of the servo valve assembly to neutral, equalizing pressure on both sides of the actuating piston and arresting further motion. Movement of the primary slide of the servo valve in the opposite direction causes the actuator body to move in the opposite direction.

C. Autopilot Control Mode

(1) Engaging the autopilot actuates the hydraulic solenoid control valve, which simultaneously ports hydraulic fluid to the autopilot engage mechanism, the autopilot shutoff valve, and the electrohydraulic servo valve.

(2) The autopilot engage mechanism operates, holding the servo valve assembly in the neutral or off position.

(3) The autopilot shutoff valve opens, connecting passages from the electrohydraulic servo valve to opposite sides of the actuator piston.

(4) In response to a signal from the autopilot, fluid from the electrohydraulic servo valve ports to one side of the actuator piston. Fluid is also ported from the other side of the actuator piston to the hydraulic return system. The difference in pressure on the piston surfaces causes the actuator body to move.

(5) Movement of the actuator body generates a balancing signal in the linear position transducer. This balancing signal assists in electrically nulling the electrohydraulic servo valve, causing fluid pressure to equalize on both sides of the actuator piston and arresting further motion.

(6) Movement of the actuator body causes movement of the aircraft control surfaces. Changes in the aircraft course generate additional error signals, which are fed back through the autopilot system to the electrohydraulic servo valve, causing a repetition of the control sequence.

D. Disengaging the autopilot de-energizes the hydraulic solenoid valve. Hydraulic bleed at the electrohydraulic servo valve depressurizes the autopilot system. The autopilot engage mechanism releases the slides of the servo valve, and the shutoff valve closes the passages from the electrohydraulic servo valve. The shutoff valve prevents loss of fluid pressure through the electrohydraulic servo valve when the power control unit is operating with the autopilot disengaged.

E. Operation of component assemblies

(1) Actuator

(a) A single piston supplies linear motion and force output to position the aircraft control surface.

(b) Piston velocity is snubbed at each end of the stroke by forcing hydraulic fluid through an orifice provided in the bypass valve and in the snubbing areas of the piston rod bearings.

(2) Bypass Valve Assembly (126, Fig. 1101).

(a) When unpressurized, the bypass valve assembly closes passages leading to the hydraulic flow control devices and provides an orifice between passages leading from each side of the actuator piston. If pressurized, the sequence is reversed.

(3) Filter Assemblies (Fig. 1101).

(a) Element (48) provides protection from contamination for actuator unit to 10 microns. Element (42) protects the autopilot control system in the actuator.

(4) Thermostatic Control Valve (61, Fig. 1101).

(a) The valve maintains hydraulic fluid temperature within the power control unit above 0°F during low ambient temperature conditions. The valve opens with decreasing fluid temperature and closes with increasing temperature.

2. Leading Particulars

A. Dimensions (approximate)

(1) Length (between support centers)

(a) Extended -- 21 in.

(b) Retracted -- 17 in.

(2) Width -- 8 in.

(3) Height -- 6 in.

B. Weight

(1) Dry -- 29 lb

(2) Filled with hydraulic fluid -- 31 lb

C. Fluid Medium - BMS 3-11

D. Operating Pressure -- 3000 psi

E. Ports

(1) Pressure Port -- Fitted per AND10050-4

(2) Return Port -- Fitted per AND10050-6

F. Electrical Characteristics

(1) Hydraulic Solenoid Valve

(a) Actuating voltage -- 28 volts dc

(b) Maximum input current -- 0.6 amperes at 70°F

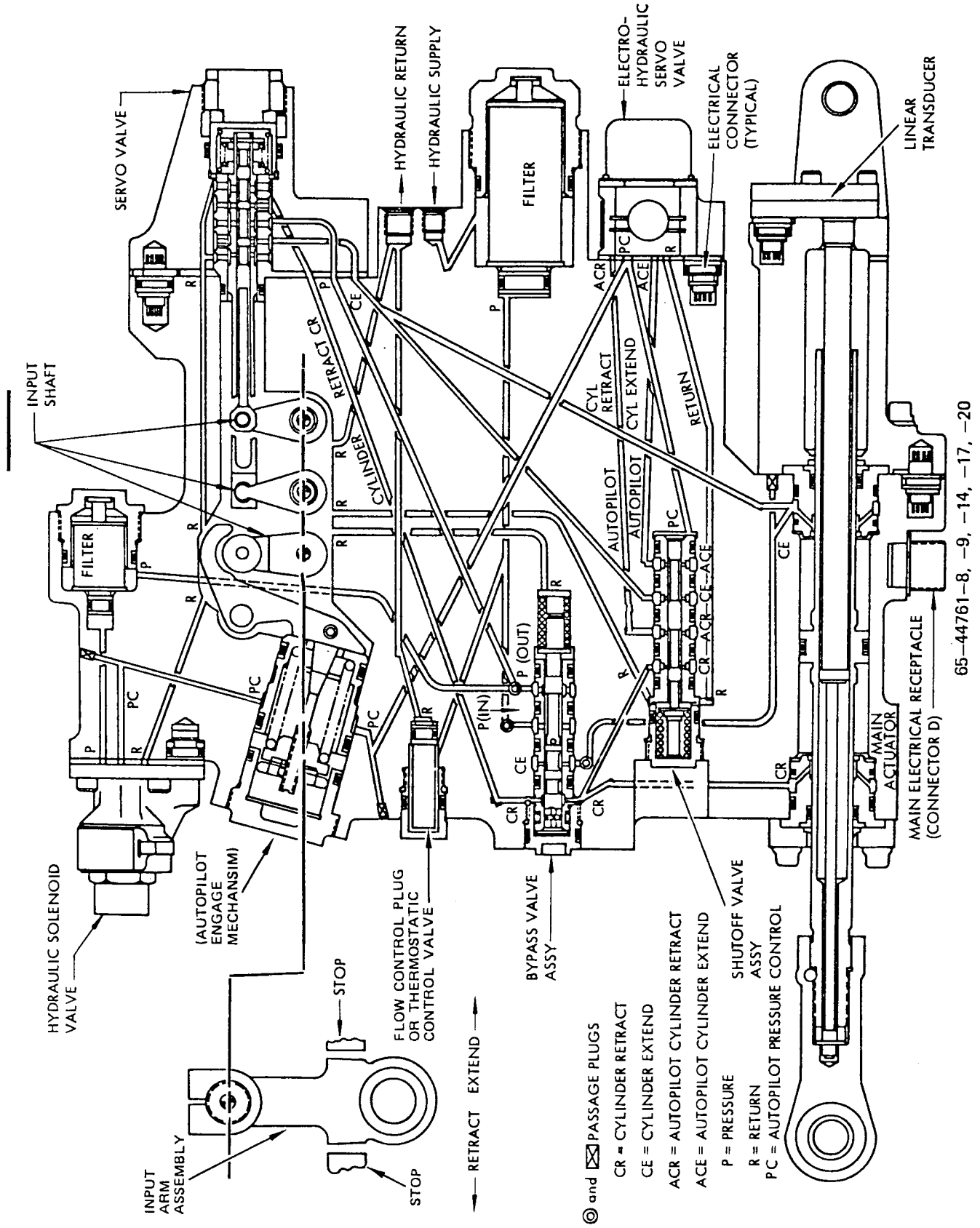
(2) Electrohydraulic Servo Valve

(a) Control Voltage -- 0 to plus or minus 8 volts dc

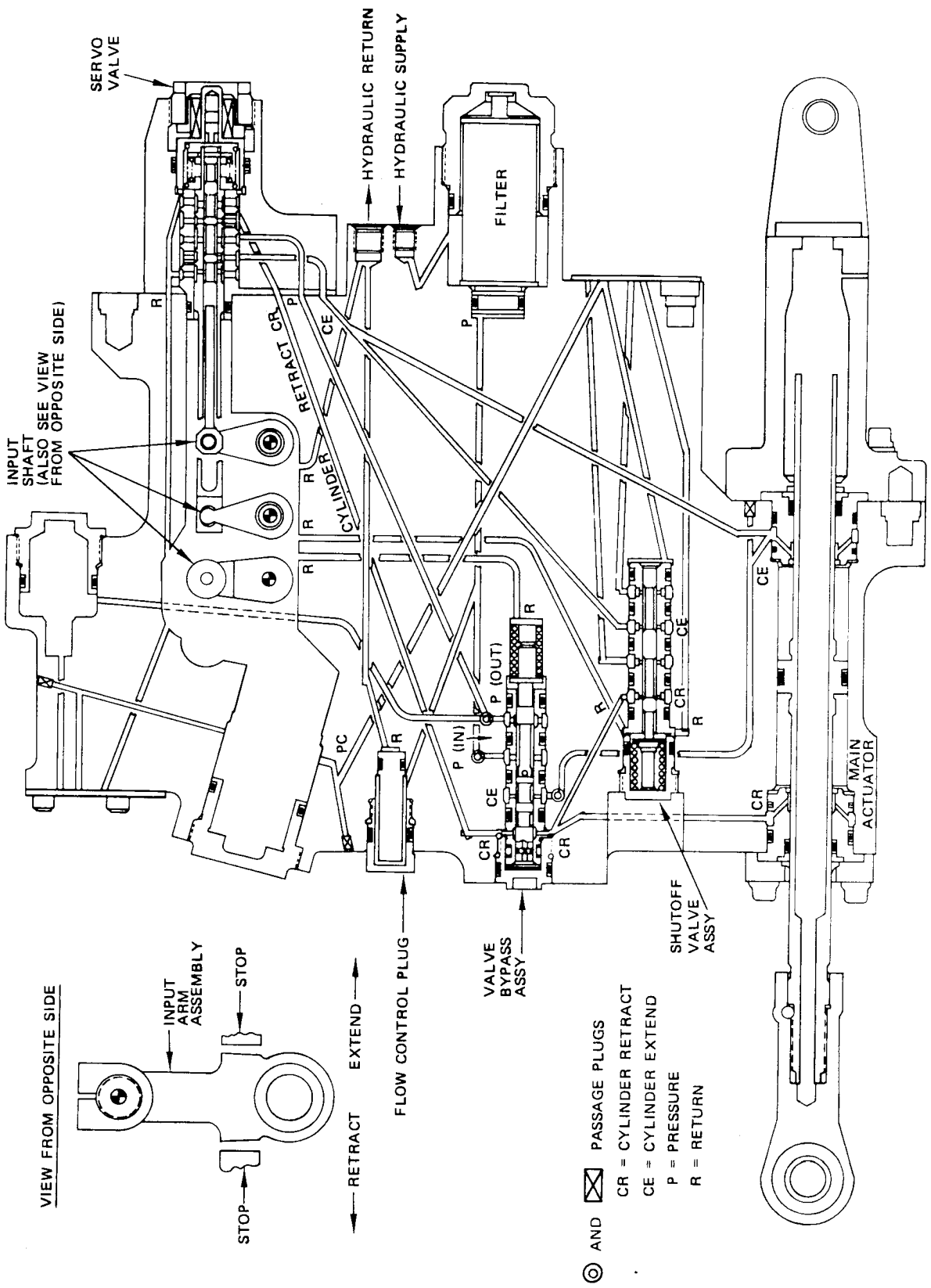
(b) Maximum signal current -- 8 milliamperes differential

(3) Linear Transducer

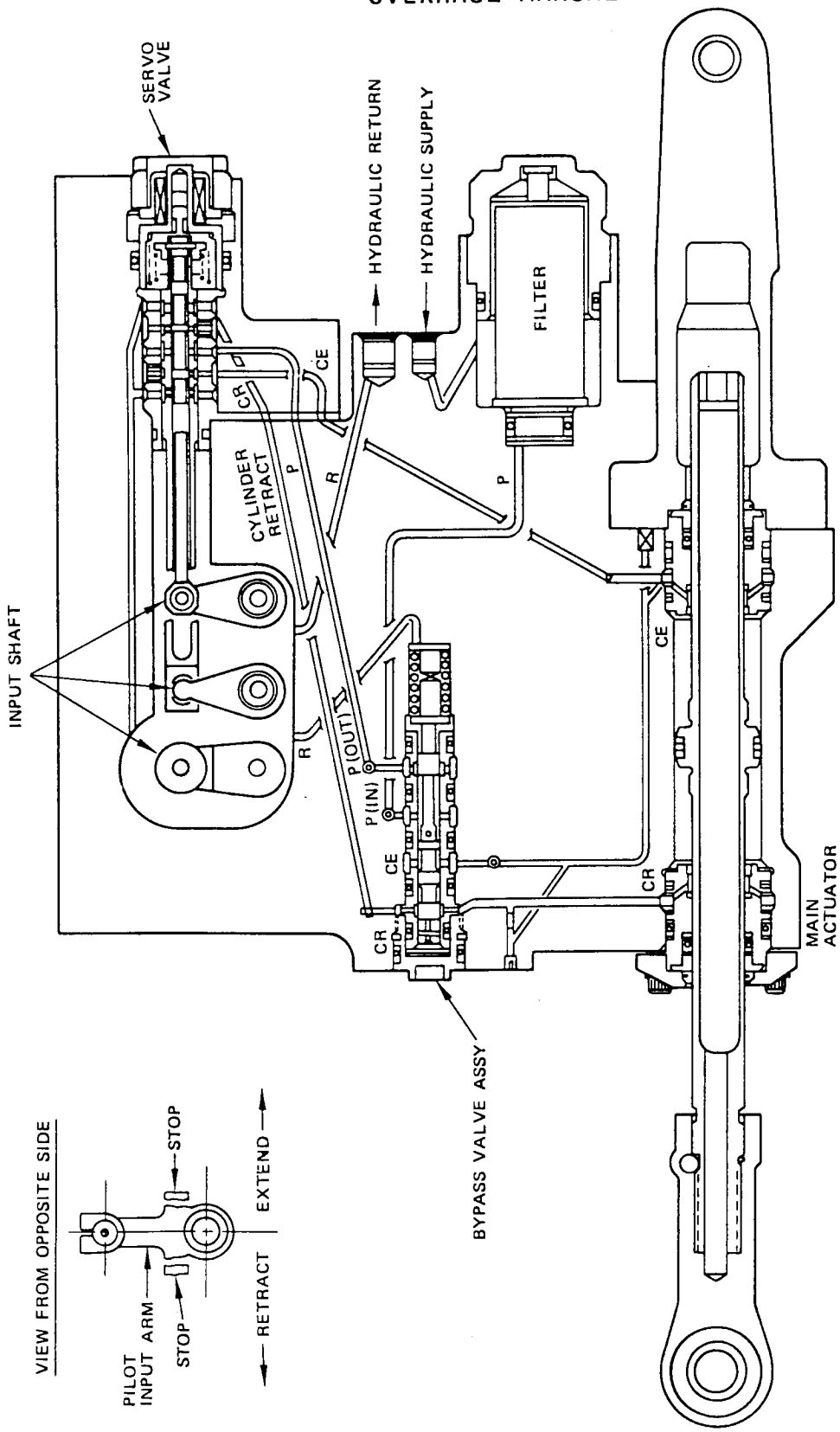
(a) Excitation voltage -- 26 volts 400 Hz ac



Aileron and Elevator Power Control Unit Assembly
Hydraulic Schematic
Figure 2 (Sheet 1)



Aileron and Elevator Power Control Unit Assembly
Hydraulic Schematic
Figure 2 (Sheet 2)



65-44761-12, -15, -16, -18, -19, -21

Aileron and Elevator Power Control Unit Assembly
Hydraulic Schematic
Figure 2 (Sheet 3)

DISASSEMBLY

1. General (Fig. 1101)

   A. It is suggested that the unit be tested and then disassembled only to the extent required to correct any defects. Refer to TESTING section, par. 13 to determine extent of overhaul required.

   B. Cut and remove all lockwire. Note the manner of lockwiring during disassembly for reference during assembly.

   C. Exercise care to prevent scoring or damage to finished surfaces. Provide suitable protection and identification for all reusable parts. If tag wire is employed, use corrosion resistant coated low alloy steel tag wire.

      NOTE: Components of matched sets are serialized to ensure proper grouping.

   D. If necessary, remove unions and packings (1 thru 4) from power control unit (5) per Fig. 1107.

2. Disassembly

   A. Disassemble Power Control Unit (Fig. 1101)

      NOTE: Check applicability of item numbers to assembly dash number. Do not remove strap (4), nameplate (5), bearing (28), arm (22, 23), washers (24), rivets (25, 26), bearing (68), rod end (69), or disassemble arm assy (113) unless repair or replacement is necessary.

      (1) Deleted.

      (2) Remove cap (1), plugs (2, 3), and drain unit.

      (3) Use a suitable holding fixture to support the power control unit during disassembly.

      (4) Remove nuts (19), bolts (20), arm assembly (21), and spacer (30).

         NOTE: Arm assembly (21) is a precision matched part and must be kept with the power control unit having the same serial number for proper fit.

      (5) Remove screws (6, 6A), valve assembly (7), or cover (7A), plate assembly (8), and packing (9).

(6) Using input cavity torque wrench adapter 65-44761-F16, remove plug (31). Strip packing (33) and rings (32) from plug (31).

(7) Remove retainer (39), rings (40), packing (41), filter element (42), packing (44), and rings (43).

(8) Remove retainer (45), packing (47), rings (46), filter element (48), packing (50), and rings (49).

(9) Remove retainer (58), packing (60), rings (59), flow control plug or thermostatic valve (61), packing (63), and rings (62).

(10) Remove retainer (131), rings (132), packing (133), spring (134), and slide (138).

(11) Using a 5/16-18 bolt of suitable length remove sleeve (139). Strip rings (135) and packings (136) from sleeve (139).

NOTE: Slide (138) and sleeve (139) are precision matched sets and must be grouped as serialized for proper fit.

(12) Remove retainer (119), rings (120), packing (121), valve assembly (126), spring (129), and guide (130).

(13) Remove slide (127) and strip rings (122, 124) and packing (123, 125) from sleeve (128).

NOTE: Slide (127) and sleeve (128) are precision matched sets and must be grouped as serialized for proper fit.

(14) Remove screws (10), electrohydraulic servo valve (11), or cover (11A), plate assembly (12), and packing (13).

NOTE: Refer to vendors publication for overhaul of electrohydraulic servo valve (11).

(15) Remove screws (51), transducer (52), or cover (52A), and packing (53).

(16) Remove bolts (54), washers (55), end fitting assembly (56, 56A), and packing (57).

NOTE: Do not disassemble end fitting assembly (56, 56A) unless repair or replacement is necessary.

CAUTION: MANIFOLD ASSY (140) MAY HAVE OVERSIZE BORE AND CONTAIN MATCHING OVERSIZE PISTON AND SEAL ASSY (81, 85).

(17) Remove collar (70), washer (71), bolts (72, 64), washers (65), and withdraw piston (85), bearing (93), retainer (87), and scraper (86) from manifold assembly (140). Remove seal assembly (81) composed of seals (82, 83), key (84). Identify parts comprising seal assembly (81), piston (85), and manifold (140) to facilitate reassembly.

NOTE: If manifold assembly (140) containing manifold 65C30861-1 is disassembled, make sure manifold 65C30861-1 is reassembled into the original manifold assembly configuration.

(18) Remove rings (90), packing (91, 92), seal (88), packing (89).

(19) Using Torque Wrench Adapter, 65-44761-F14-2, remove rod end assembly (67) and extract transducer probe (52) (Fig. 101).

(20) Remove bearing (80), retainer (74), scraper (73), and flange (66) from piston rod (85).

(21) Remove rings (77), packing (78, 79), seal (74A, 75), and packing (76).

(22) Remove retainer (94), packing (95), nut (100), and lock (101).

(23) Using Autopilot Spring Guide Wrench 65-44761-F13, remove guide (102) and spring (103) (Fig. 102).

(24) Using a brass rod with end flattened and bent at right angles remove piston (112) (Fig. 103). Strip seals (105, 106, 109, 110) and keys (107, 111) from piston.

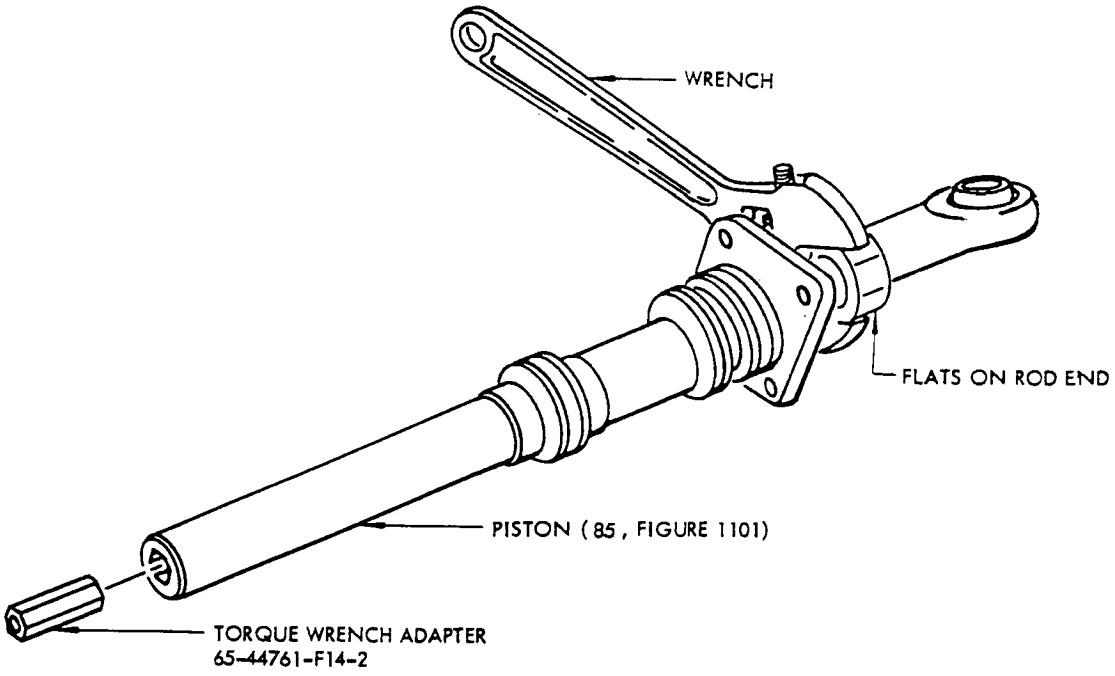
(25) Remove pins (29), inner shaft (3, 3A, Fig. 1103) and packing (27) carefully disengaging shaft driving ball from primary slide (11, Fig. 1102).

NOTE: Do not disassemble parts (1, 4, 5, 6, 6A, 6B, Fig. 1103) unless replacement is necessary.

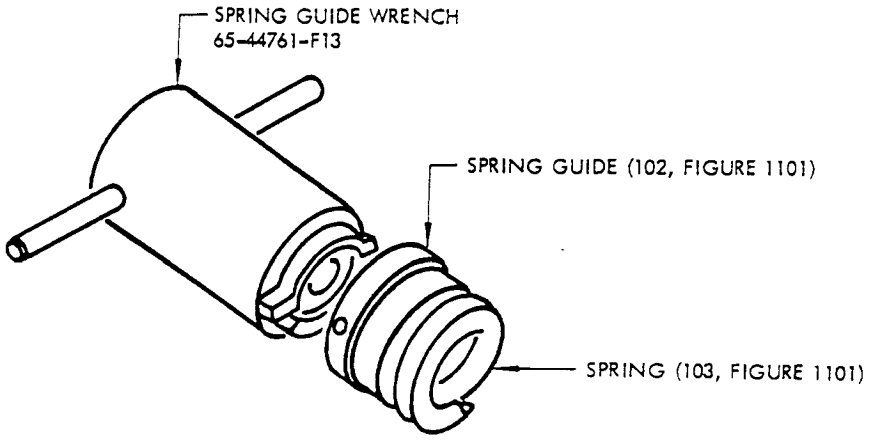
(26) Remove bolts (14) and servo assembly (18), carefully disengaging secondary slide (12, Fig. 1102) from driving ball on outer shaft (2, Fig. 1103).

(27) Remove plate assembly (15), rings (16), and packing (17).

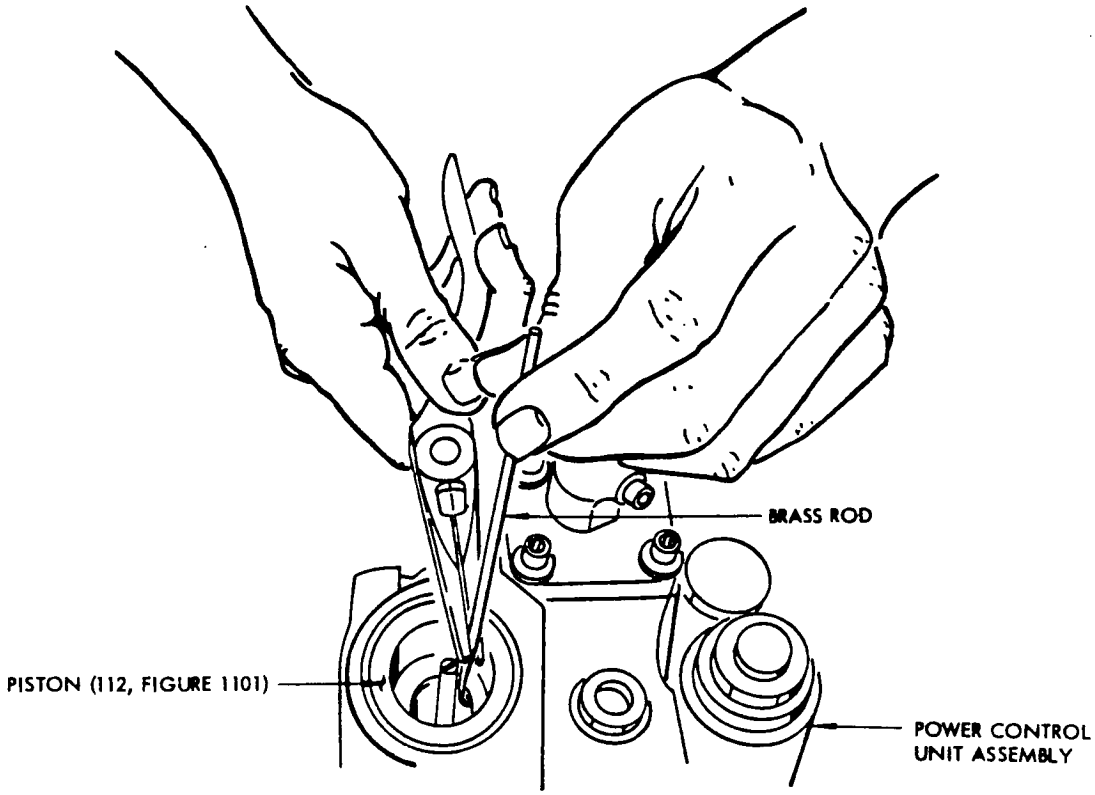
(28) Remove outer shaft from manifold assembly (140).



Removing Rod End Assembly From Piston
Figure 101



Using Autopilot Engage Assembly Spring Guide Wrench
Figure 102



Removing Rod End Assembly From Piston
Figure 103

(29) Using Eccentric Shaft Plug Torque Wrench Adapter, 65-44761-F20 remove plug (96) and extract plate (97).

(30) Install a 4-40 screw of suitable length in threaded hole in the end of shaft (99). Remove shaft (99) by pulling on the screw. Remove packing (98) and 4-40 screw from shaft (99).

(31) Remove arm assembly (113) through opening provided for piston (112). As arm assembly is being withdrawn, twist it through approximately 180 degrees.

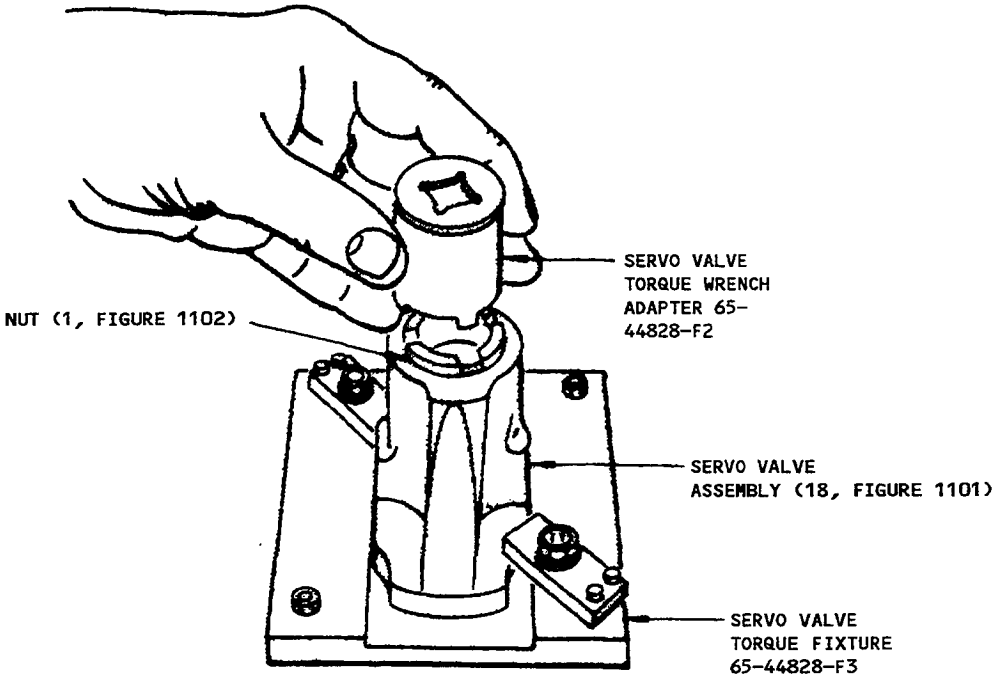
(32) Remove bearings (35 and 36), ring (37), and packing (38) from manifold assembly (140). Do not disassemble manifold assembly (140) unless repair or replacement of components is required.

B. Disassemble Servo Valve Assembly (See figure 1102.)

(1) Do not remove sleeve (14) from housing (15) unless replacement is necessary.

(2) Remove slide (11).

(3) Use Servo Valve Torque Fixture, 65-44828-F3A and Servo Valve Torque Wrench Adapter, 65-44828-F2 to remove nut (1). Extract retainer (2) and spring (5). (See figure 104.)



Removing Nut from Servo Valve Assembly
Figure 104

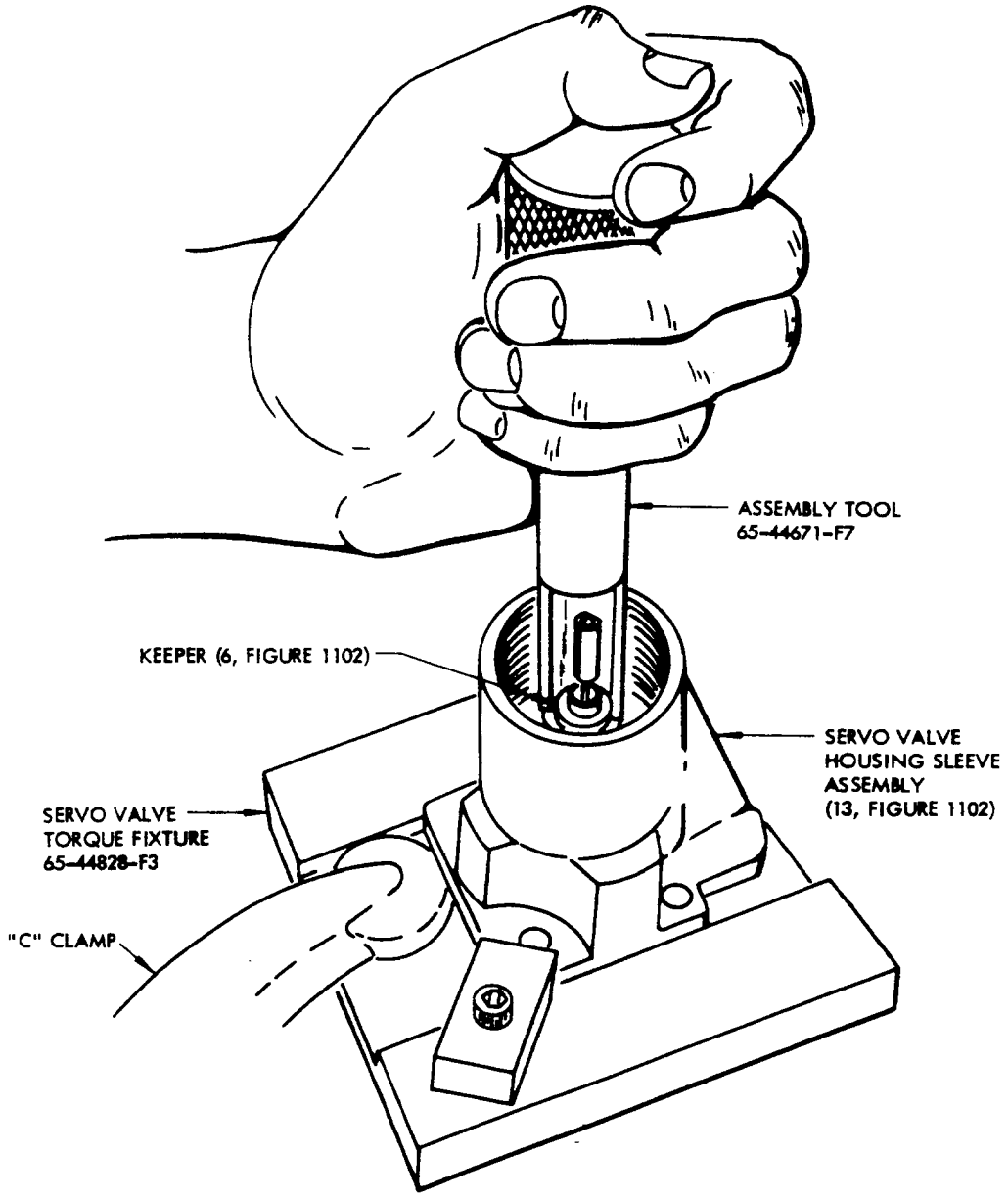
G74764

(4) Using Assembly Tool 65-44671-F7, depress guide (7) and extract keeper (6), guide (7), spring (8), and seat (9). (See figure 105.)

(5) Remove slide (12).

NOTE: Slides (11 and 12) and housing sleeve assembly (13) are precision matched parts and must be grouped as serialized, to obtain the proper fit.

(6) Remove rings (3) and packing (4).



Removing Keeper from Servo Valve Assembly
Figure 105

C. To disassemble the Hydraulic Solenoid Control Valve Assembly (7, Fig. 1101), refer to the manufacturer's overhaul manual.

CLEANING

1. General

   A. Wash all metal parts except bearings (35, 36, 68, Fig. 1101) and (5, Fig. 1103) in solvent, P-D-680.

   B. Clean all bores, holes, threads, passages, and chambers using a stiff bristle brush.

   C. Dry parts with a clean, lint-free cloth or moisture-free compressed air.

2. Filter Elements (Fig. 1101)

   A. Backwash filter elements (42, 48) with solvent, P-D-680, or equivalent.

   B. If necessary, use soft bristle brush to remove deposits of foreign material.

   C. Dry by blowing clean dry low pressure air through element.

3. Bearings

   A. Wipe bearings (35, 36, 68, Fig. 1101) and (5, 1103) with a lint-free cloth, moistened with solvent P-D-680.

      CAUTION: BEARING (68) IS TEFLON LINED. DO NOT IMMERSE IN SOLVENT.

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

   C. For further information, refer to 20-30-01.

4. Servo Valve Components (Fig. 1102)

   A. Ultrasonic clean springs (5, 8), keeper (6), guide (7) and seat (9).

INSPECTION/CHECK

1. Check all parts for obvious defects in accordance with standard industry practices. Refer to Fits and Clearances for wear limits.

2. Components of Power Control Unit Assembly (Fig. 1101).

   A. Examine sliding surfaces on piston (85) and ID of bearings (80, 93) and retainers (74, 87) for scoring or evidence of abnormal sliding action.

   B. Examine electrohydraulic servo valve assembly (11)

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

      (2) Examine surface of sealing area surrounding each of the four flow passages. There must be no defects or damage which would cause leakage.

      (3) For further information, refer to manufacturer's overhaul procedures.

   C. Check filter elements

      (1) Install filter element (42) in Test Fixture, TF59197-105 or equivalent; and filter element (48) in Test Fixture, TF59197-107 or equivalent, as shown in Fig. 301.

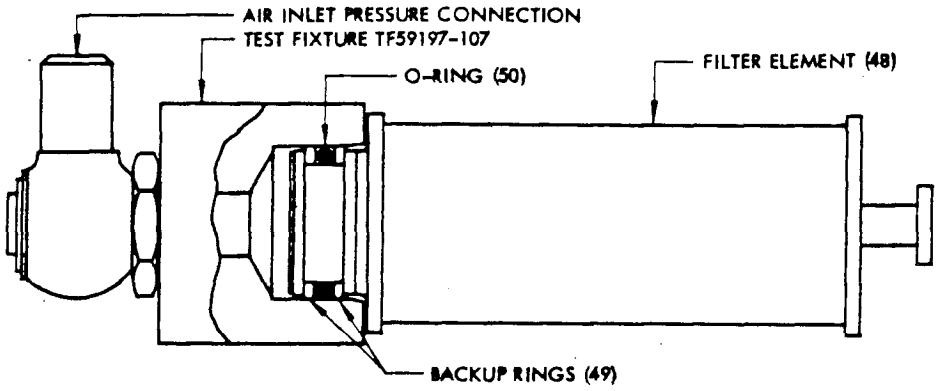
      (2) Connect test fixture and filter element to test setup as shown.

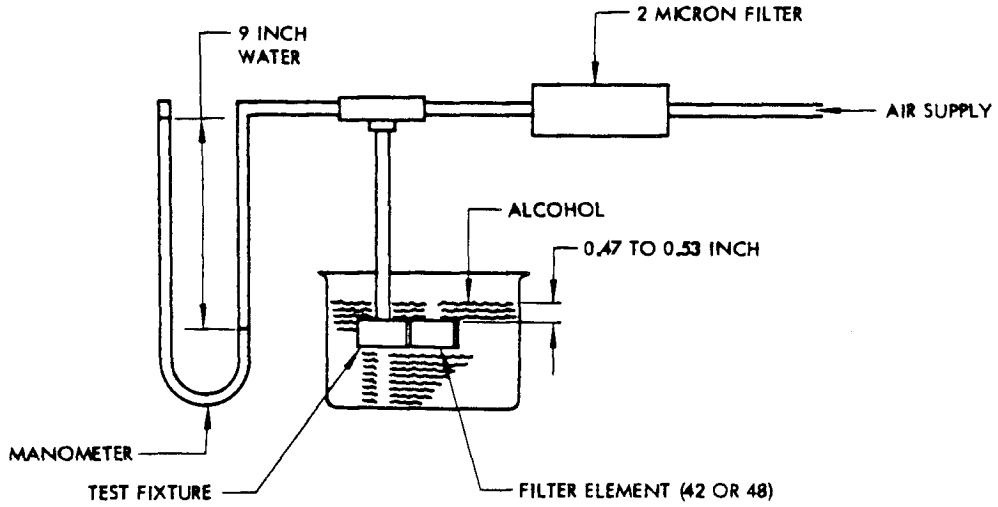
      (3) Connect a source of clean, dry air, filtered to 2 microns nominal, and a 10-inch water manometer to test fixture as shown.

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

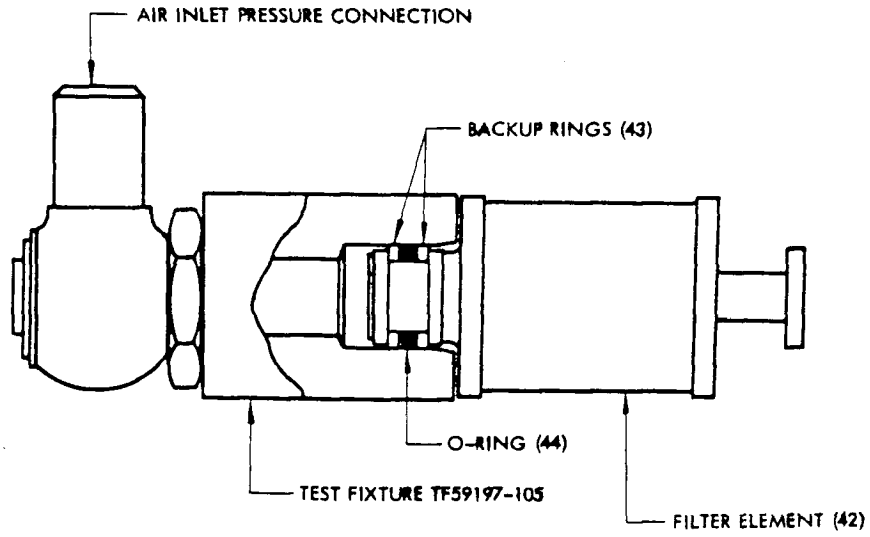
      (5) Apply air pressure equal to 9 inches of water to the filter element.

      (6) Rotate filter element through 360 degrees about its axis. Check that there is no leakage of air through the filter element.





TEST SETUP



Filter Element Check Details
Figure 301

D. Check bypass and shutoff valve assemblies (126, 137)

(1) Examine mating surfaces of slides and sleeves for scoring or evidence of abnormal sliding action.

(2) Lubricate matched slides and sleeves (127, 128) and (138, 139) with hydraulic fluid BMS 3-11. Install slide (127) in sleeve (128), and slide (138) in sleeve (139).

(3) Turn each assembly on end with flange of slide down. Slide must drop freely, a minimum of 0.20 inch, by its own weight. Repeat at three angular positions spaced 120 degrees apart.

E. Penetrant examine plug (31), retainers (39, 45, 94) and bearings (80, 93) per 20-20-02.

F. Magnetic particle examine arm (118), retainers (58, 74, 87, 119, 131), flange (66), rod end (69), pistons (85, 112), plug (96), plate (97), shaft (99), guides (102, 130), clevis (117), per 20-20-01.

G. Check springs (103, 134, 129) in accordance with spring test data (Fig. 302).

3. Components of Servo Valve Assembly (Fig. 1102)

A. Examine mating surfaces of slides (11, 12) and sleeve (14) for scoring or evidence of abnormal sliding action. Check holes in ends of slides for scoring or damage.

CAUTION: SLIDE (11) MUST BE INSERTED CORRECTLY INTO SLIDE (12). LARGE HOLES IN ENDS OF SLIDES CONTACT BALL PINS (4, FIG. 1103) OF SHAFTS (6, 2) DURING OPERATION OF THE UNIT.

B. Lubricate slides (11, 12) with hydraulic fluid, BMS 3-11 and install in housing sleeve assembly (13).

C. Position slides with their drive holes centered at a distance of 1.975 inches from mounting face of housing (15). Check that slides move smoothly and freely, relative to each other and to housing sleeve assembly (13), by their own weight, a minimum of 0.20 inch in either direction from the 1.975 inches position.

D. Examine surface of the sealing area around each of the flow ports of housing (15). There must be no defects or damage which will cause leakage after assembly.

E. Perform magnetic particle examination per 20-20-01 of nut (I), retainer (2), guide (7), seat (9).

F. Perform penetrant examination per 20-20-02 of keeper (6).

G. Test springs (5, 8) in accordance with Fig. 302.

4. Components of Input Shaft Assembly (Fig. 1103)

A. Perform a magnetic particle examination on pin (1), shaft (2), ball (4), and shaft (6, 6A, 6B).

B. Check ball (4) and bearing (5) for looseness or scoring.

SPRING CHECK DATA			
Figure and Index No.	Approimate Free Length (Inches)	Test Length (Inches)	Allowable Load Limits (Pounds)
1101-103	2.572	1.620 2.000 1.540	120 - 146 72 - 88 No permanent set
1101-129	1.613	1.01 1.11 0.978	45.00 - 49.00 37.30 - 41.70 No permanent set
1101-134	1.27	0.88 0.93 0.80	23.40 - 28.60 20.40 - 24.80 No permanent set
1102-5	1.27	0.79 0.73 0.64	7.47 - 9.13 8.46 - 10.34 No permanent set
1102-8	0.99	0.51 0.41 0.34	7.47 - 9.13 9.00 - 11.00 No permanent set

Spring Test Data
Figure 302

5. End Fitting Assembly (Fig. 1104)

   A. Examine inserts (11, 12) for damaged, broken or distorted coils.

   B. Check wiring for continuity and dielectric strength in accordance with TESTING, par. 4.

   C. Perform a penetrant examination per 20-20-02 on end fitting (13).

6. To check the components of the Solenoid Control Valve Assembly (7, Fig. 1101), refer to the manufacturer's overhaul manual.

7. Manifold Assembly (Fig. 1106)

   A. Check contacts of plug assemblies (3, 10, 17, 24) and receptacle assembly (30) for corrosion and distortion.

   B. Examine pins (31) and plugs (32) for security of installation.

   C. Check inserts (33, 34, 35, 36) for damaged, broken or distorted coils.

   D. Check cavities and ports for particle contamination.

   E. Perform penetrant examination per 20-20-02 on manifold (37).

F. Check wiring for continuity and dielectric strength in accordance with TESTING, par. 11.

G. Examine cylinder bore in manifold (37) for wear, scoring or evidence of abnormal sliding action.

8. Manifold Assembly (Fig. 1106A)

A. Examine pins (1, 10) and plugs (5, 15) for security of installation.

B. Check potted cavity for good edge seal.

C. Check inserts (35, 40) for damaged, broken, or distorted coils.

D. Perform penetrant examination per 20-20-02 on manifold (50).

REPAIR

1. Repair

A. Repair minor defects in accordance with standard industry practices. Surface finish smoothness of lapped parts may be restored by relapping if necessary.

CAUTION: DO NOT LAP MORE THAN NECESSARY AS WEAR LIMITS MIGHT BE EXCEEDED. DO NOT BUFF LAPPED SURFACES OR ADVERSE EFFECTS WILL RESULT.

(1) thru (3) Deleted.

B. Piston (85, Fig. 1101) (65-44666-1)

NOTE: Material: 4340 steel (180-200 ksi).

(1) Machine 0.7478-inch OD per 20-10-01 to 0.7378 minimum OD to remove defects.

(2) Stress relieve at 800-850°F for 2 hours if base metal was machined.

(3) Magnetic particle examine per 20-20-01.

(4) Shot-peen per 20-10-03.

(5) Build up surface with hard chrome plate per 20-42-03. Maximum plating thickness to be 0.005 inch.

(6) Grind to restore original dimensions shown in Fig. 401 per 20-10-04.

C. Piston (85, Fig. 1101)(65-44673-1, 65-44773-1).

NOTE: Material: 17-4 PH CRES (180-200 ksi).

(1) Machine 0.7478-inch OD per 20-10-01 to 0.7378 minimum OD to remove defects.

(2) Stress relieve at 815-865°F for 2 hours if base metal was machined.

(3) Magnetic particle examine per 20-20-01.

(4) Shot-peen per 20-10-03.

(5) Build up surface with hard chrome plate per 20-42-03. Maximum plating thickness to be 0.005 inch.

(6) Grind to restore original dimensions shown in Fig. 401 per 20-10-04.

D. Piston (112, Fig. 1101)

NOTE: Material: 17-4 PH CRES (180-200 ksi).

(1) Machine 1.737- and 1.612-inch OD surfaces per 20-10-01 to remove defects. Minimum OD's are 1.727 and 1.602 inches, respectively.

(2) Stress relieve at 815-865°F for 1 hour if base metal was machined.

(3) Magnetic particle examine per 20-20-01.

(4) Shot-peen per 20-10-03.

(5) Build up surface with hard chrome plate per 20-42-03. Maximum plating thickness to be 0.005 inch.

(6) Grind to restore original dimensions shown in Fig. 401 per 20-10-04.

E. Shaft (99, Fig. 1101)

NOTE: Material: 17-4 PH CRES (180-200 ksi).

(1) Machine 0.3122 OD per 20-10-01 to 0.3062 minimum OD to remove defects.

(2) Stress relieve at 815-865°F for 1 hour if base metal was machined.

(3) Magnetic particle examine per 20-20-01.

(4) Shot-peen per 20-10-03.

(5) Build up surface with hard chrome plate per 20-42-03. Maximum plating thickness to be 0.003 inch.

(6) Grind to restore original dimensions shown in Fig. 401 per 20-10-04.

F. Input Arm (21, Fig. 1101)

(1) Refer to instructions in Repair, par. 3.C(3) for replacement and Testing , para 12,J for repair and calibration.

G. Manifold Cylinder Bore (37, Fig. 1106; 50, Fig. 1106A).

CAUTION: THOROUGHLY CLEAN MANIFOLD AND PASSAGES AFTER MACHINING TO REMOVE METAL PARTICLES. ALL PINS AND PLUGS MUST BE REMOVED AND REINSTALLED PER 20-50-04.

(1) Method 1 -- Oversize & Anodized Bore (Fig. 400)

CAUTION: A MANIFOLD REPAIRED BY THIS PROCEDURE REQUIRES OVERSIZE PISTON AND SEAL ASSEMBLY (81, 85, FIG. 1101).

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

(b) Shot-peen as noted and machine relief area in bore (Dia. -B-).

(c) Hard anodize relief as noted.

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

(e) Chromic acid anodize bore entry chambers.

(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 or 0.030 OS adjacent to bore on flat surface.

(2) Method 2 -- Chrome Plated Bore: Deleted. Superseded by method 3, steel sleeved bore.

(3) Method 3 -- Steel Sleeved Bore (Fig. 400A)

NOTE: This method allows for repair of manifolds which have bare, hard anodized, chrome plated, or oversized bores, providing wear does not exceed 1.358 - 1.360 inch diameter.

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

(b) Fabricate sleeve 65C30861-2 as shown in Fig. 400A (Sheet 2). Use 4330M or 4130 seamless tubing, heat treated to 150-170 KSI.

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

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

(e) Finish as shown on Fig. 400A (Sheet 2).

(f) Hone the 1.358-1.360 inch dia bore to obtain a 0.0014-0.0020 interference fit to actual sleeve OD. 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 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 number 65C30861-1.

NOTE: Make sure manifold is reassembled into the original manifold assembly configuration.

(n) Steel stamp SS on nameplate (5, Fig. 1101) after serial number.

H. Shaft (2, Fig. 1103)

NOTE: Material: 17-4PH CRES (180-200 ksi).

(1) Machine 0.8737 OD as specified by 20-10-01 to 0.8537 minimum OD to remove defects.

(2) Stress relieve at 850-900°F for 1 hour if base metal was machined.

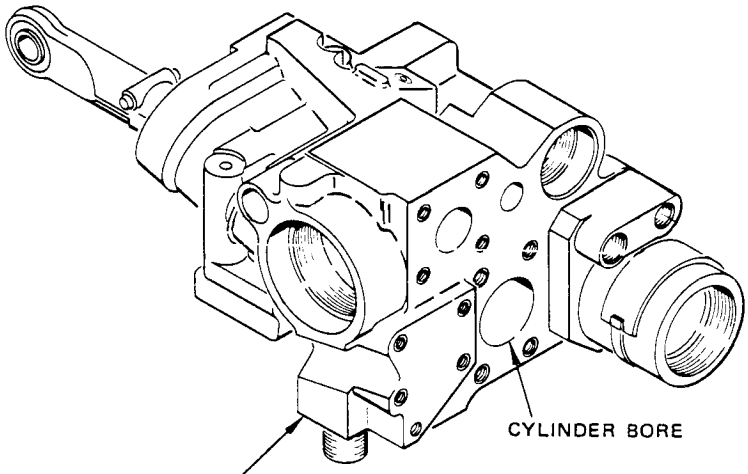
(3) Magnetic particle examine as specified by 20-20-01, Class B.

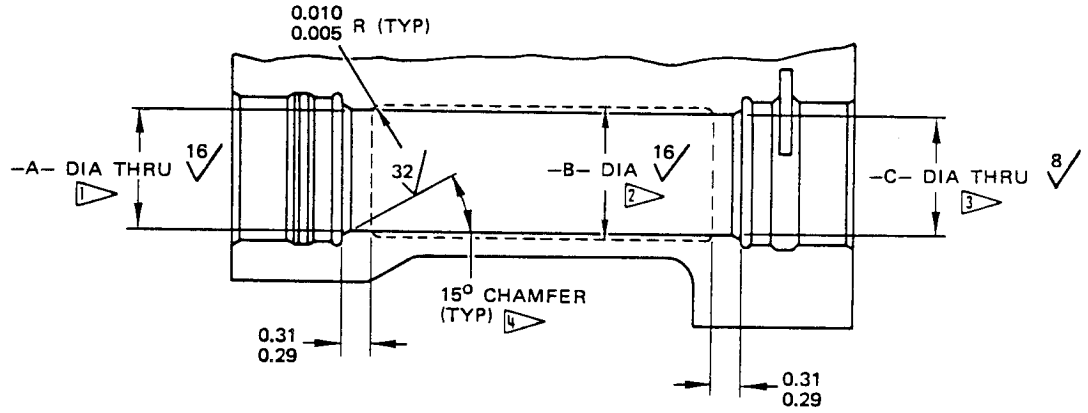
(4) Shot peen as specified by 20-10-03.

(5) Build up the surface with hard chrome plate as specified by 20-42-03. Maximum plate thickness to be 0.010 inch.

(6) Bake within 10 hours of chrome plating at 350-400°F for 12 hours minimum.

(7) Grind to restore the shaft to the original dimensions shown in Fig. 401 as specified by 20-10-04.





REPAIR

AS NOTED 1 2 3 4

SHOT PEEN (REF 20-10-03)
0.016 – 0.033 SHOT SIZE
0.010 – 0.013A 2 INTENSITY

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

-A- 1	-B- 2	-C- 3	AMOUNT OF OVERSIZE
1.252 1.251	1.258 1.257	1.257 1.256	0.015
1.267 1.266	1.273 1.272	1.272 1.271	0.030

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.

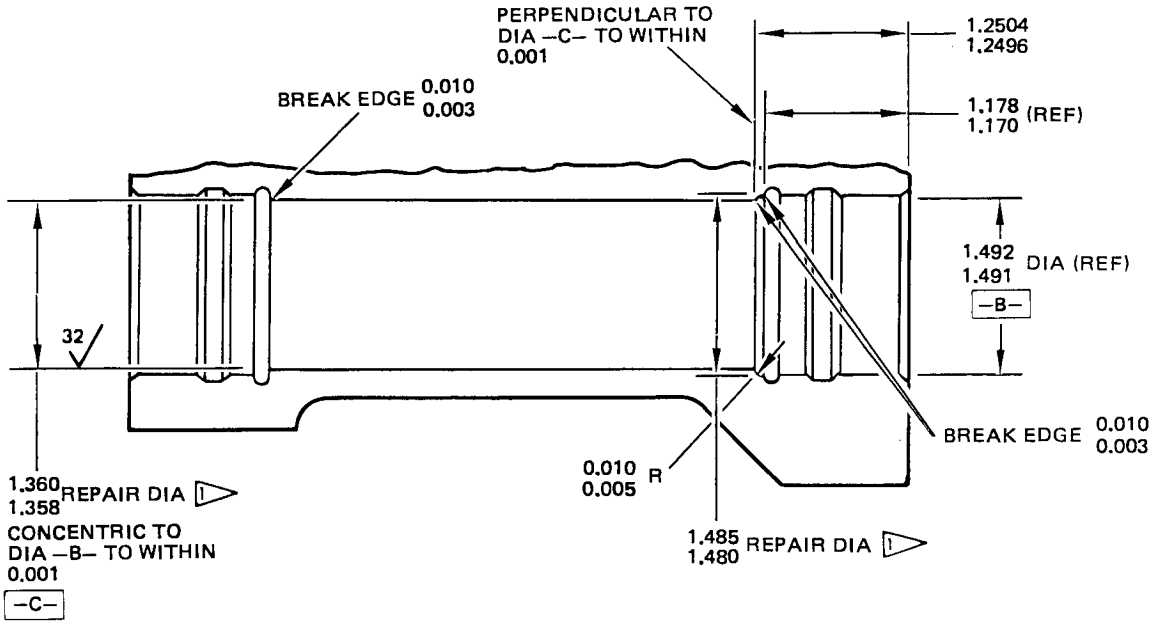
3 AFTER 2 HONE BORE TO THIS DIA.

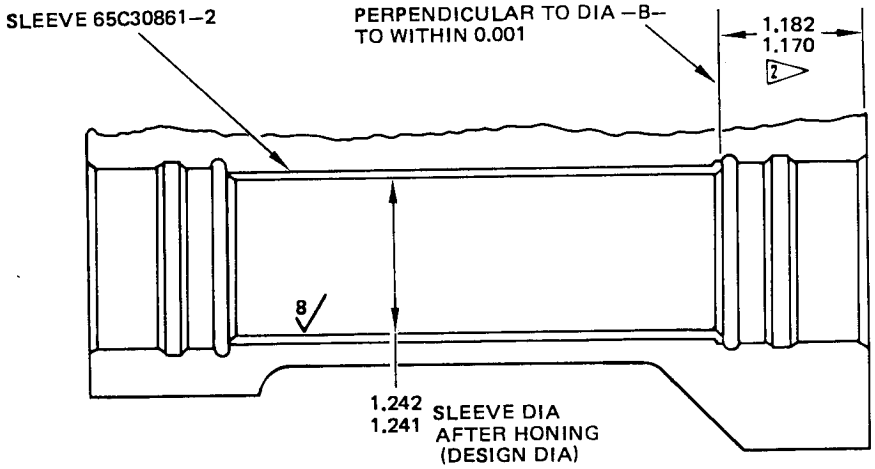
4 CHROMIC ACID ANODIZE (F-2.26) CHAMFERS.

65–44835–1 SHOWN

OVERSIZE AND ANODIZED BORE

Manifold Bore Repair (Method 1)
Figure 400





65C30861–1 MANIFOLD ASSY

REFINISH (EXTERIOR)

CHROMIC ACID ANODIZE (F–2.26)

1 REPAIR DIA FOR INSTALLATION OF REPAIR SLEEVE

2 DIMENSION FROM SLEEVE FLANGE TO FACE OF MANIFOLD

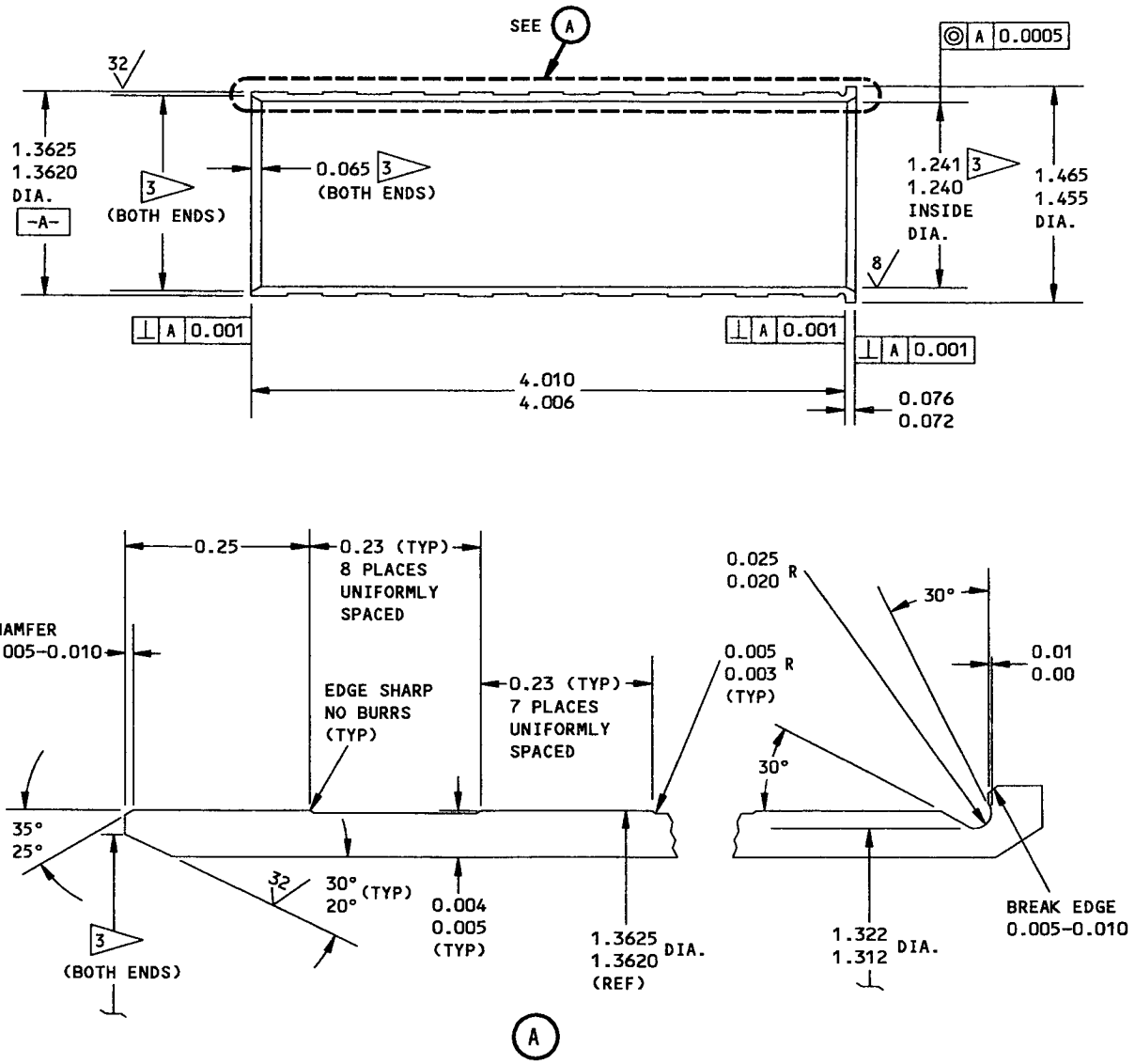
REPAIR

REF 1

MATERIAL: AL ALLOY
ALL DIMENSIONS ARE IN INCHES

STEEL SLEEVE REPAIR

Manifold Bore Repair (Method 3)
Figure 400A (Sheet 1)



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. CHAMFER (BOTH ENDS)

REPAIR

MATERIAL: 4330M OR 4130 SEAMLESS STEEL TUBING. 150-170 KSI

ALL DIMENSIONS ARE IN INCHES

TOLERANCES: ANGLES ± 1/2°
DECIMALS ± 0.01

STEEL SLEEVE FABRICATION

Manifold Bore Repair (Method 3)
Figure 400A (Sheet 2)

2. Refinish

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

A. Refinish plated or painted surfaces if worn or chipped.

B. Components of Aileron and Elevator Power Control Unit Assembly (Fig. 1101).

(1) Arms (22, 23), washer (24), retainers (58, 119, 131), rod end (69), plug (96), plate (97), guide (102, 130), piston (112), bushing (116), and clevis (117) -- Passivate per F-8.07 all over.

(2) Plugs (31, 61) and retainers (39, 69-35688-1, 45) -- Apply F-2.26 all over. Material: Alum alloy.

(2A) Retainer (39) (69-35688-2) -- Passivate (F-17.09) interior and open end to thread chamfer. Cadmium plate (F-15.06) exterior except passivated area. Material: 15-5PH CRES, 150-170 ksi.

(3) Flange (66) -- Cadmium plate F-15.06, thickness 0.001 - 0.003 inch, all over. Material: 4340 steel, 150-170 ksi.

(4) Retainers (74, 87) -- Fig. 401. Material: 17-4PH CRES, 180-200 ksi.

(5) Bearings (80, 93) -- Fig. 401. Material: Al-Ni-Bronze, no heat treat.

(6) Piston (85) (part number 65-44666-1) (Fig. 401).

NOTE Refer to SOPM 20-10-01 for repair and refinish of high strength steel parts.

(a) Apply F-1.842 to indicated areas. Do not allow plating beyond indicated points.

(b) Apply F-1.1923, 0.0002-0.0004 inch thick to indicated areas.

(c) Lap the sliding surfaces of piston rod.

1) Crisscross lap indicated areas to a surface finish of 4 to 8 microinches.

2) Solvent clean surfaces in accordance with 20-30-03 using perchloroethylene.

3) (Optional step) Crisscross lap with teflon using 40-50 reciprocal strokes. Apply substantial pressure to teflon lap. Wipe excess teflon from surface.

(7) Piston (85) (65-44673-1, 65-44773-1) (Fig. 401).

NOTE: Refer to 20-10-01 for repair and refinish of high strength steel parts.

(a) Passivate per F-8.07 all over.

(b) Apply F-1.842 to indicated areas. Do not allow plating beyond indicated points.

(c) (Optional step) Repeat step (6)(c) preceding.

(8) Retainer (94) -- Apply flash hardcoat and dichromate seal 0.0002-0.0003-inch thick all over in accordance with MIL-A-8625, except apply F-2.204 to indicated area shown in Fig. 401.

(9) Shaft (99) -- Passivate per F-8.07 all over except radii and areas to be plated as shown in Fig. 401.

(10) Manifold assembly (140) (65-44836-1, -17, -18) -- Apply F-2.940 to ID of outer bearing hole, provided for shaft (99)

(11) Plug (31), retainer (45) -- Chromic acid anodize (F-2.26 or F-17.04) plus apply one coat BMS 10-11, Type 1, primer (F-20.02) to surfaces shown in Fig. 401.

C. Components of Servo Valve Assembly (Fig. 1102)

(1) Nut (1) -- Apply F-1.1923 all over, 0.0002-0.0004-inch thick.

(2) Retainer (2), keeper (6), guide (7), seat (9), and housing (15) -- Passivate per F-8.07 all over.

(3) Sleeve (14) -- (Fig. 401)

D. Components of Input Shaft Assembly (Fig. 1103)

(1) Shaft (2) -- Passivate per F-8.07 all over and apply F-1.842 to areas indicated in Fig. 401.

(2) Ball (4) -- (Fig. 401).

(3) Shaft (6, 6A, 6B) -- (Fig. 401).

E. Components of End Fitting Assembly (Fig. 1104)

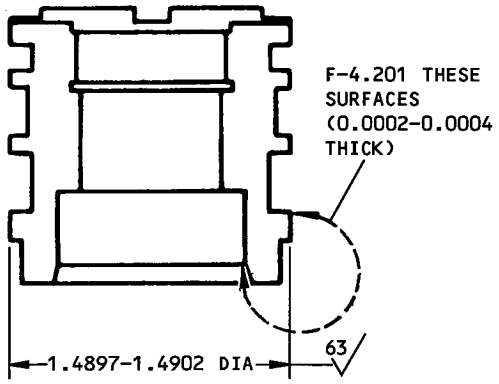
(1) Bushing (10) -- Apply F-1.1923, 0.0002-0.0003-inch thickness. Outside diameter of bushing must be 0.6264-0.6270 inch with a surface finish of 32 microinches or better.

(2) Fitting (13) -- Apply F-2.26 all over.

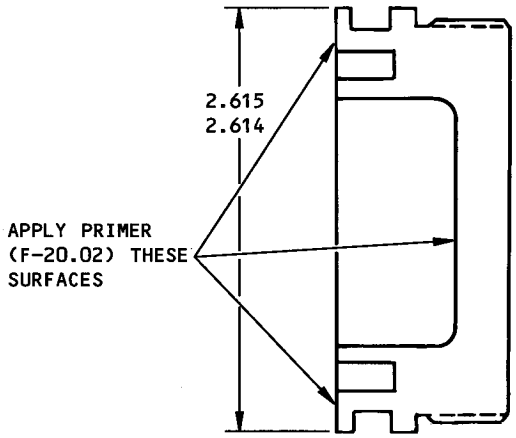
F. Components of Manifold Assembly (Fig. 1106) (65-44836-1, -17)

(1) Bushing (1) and plate (2) -- Apply F-8.07 all over.

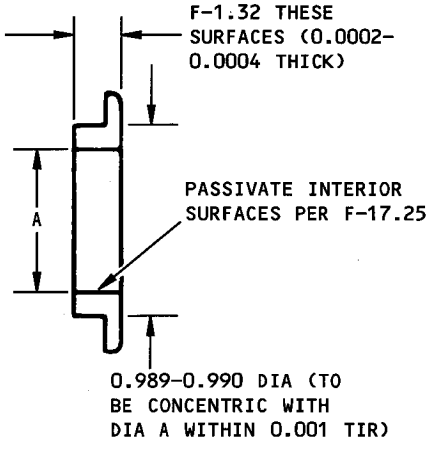
(2) Manifold (37) -- Apply F-2.26 all over (except on bores with hard anodize finish).



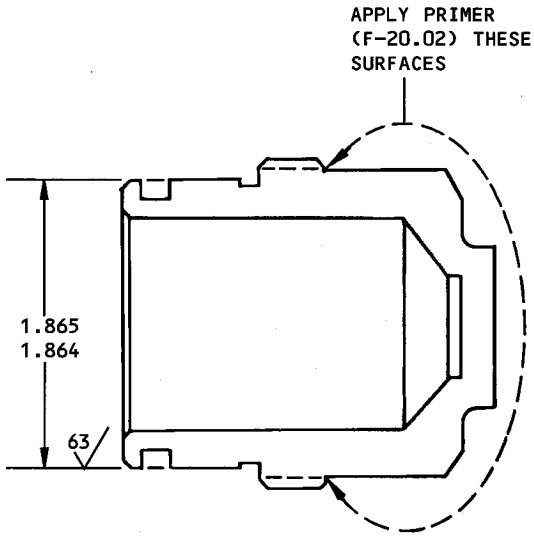
BEARING (80 AND 93, FIGURE 1101)



PLUG (31, FIGURE 1101)



RETAINER (74 AND 87, FIGURE 1101)

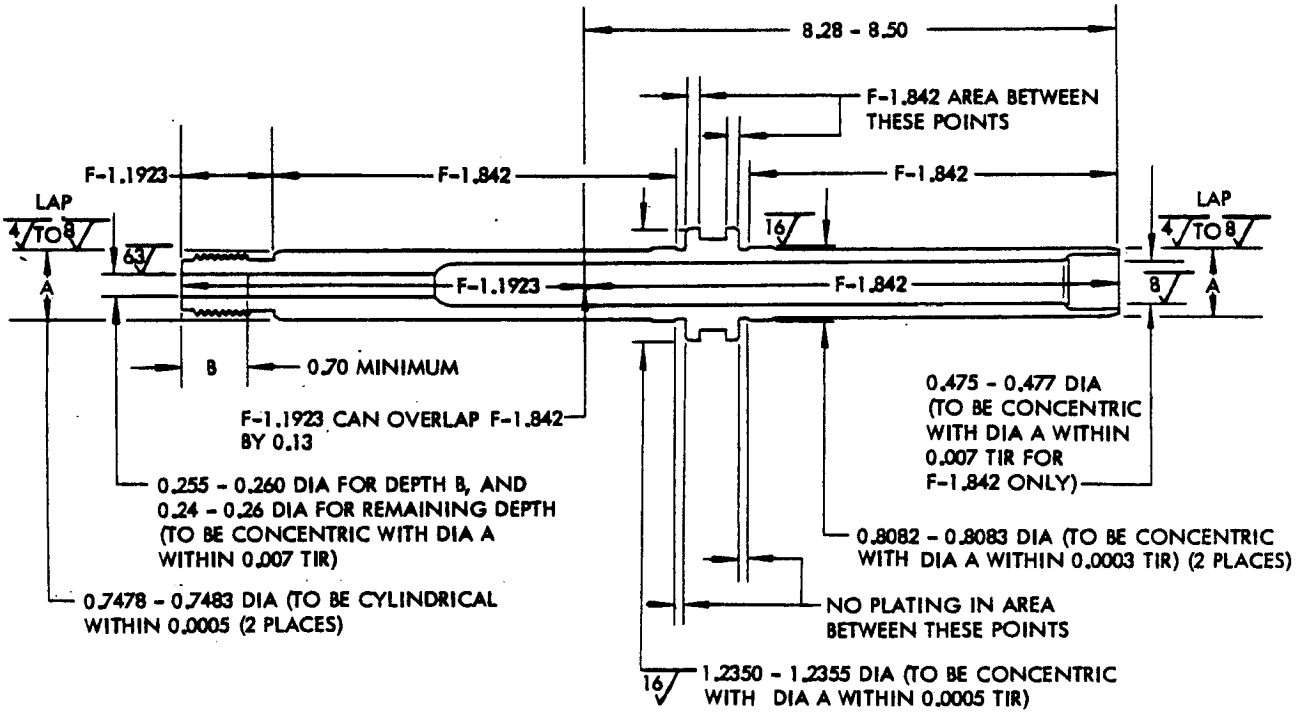


RETAINER (45, FIGURE 1101)

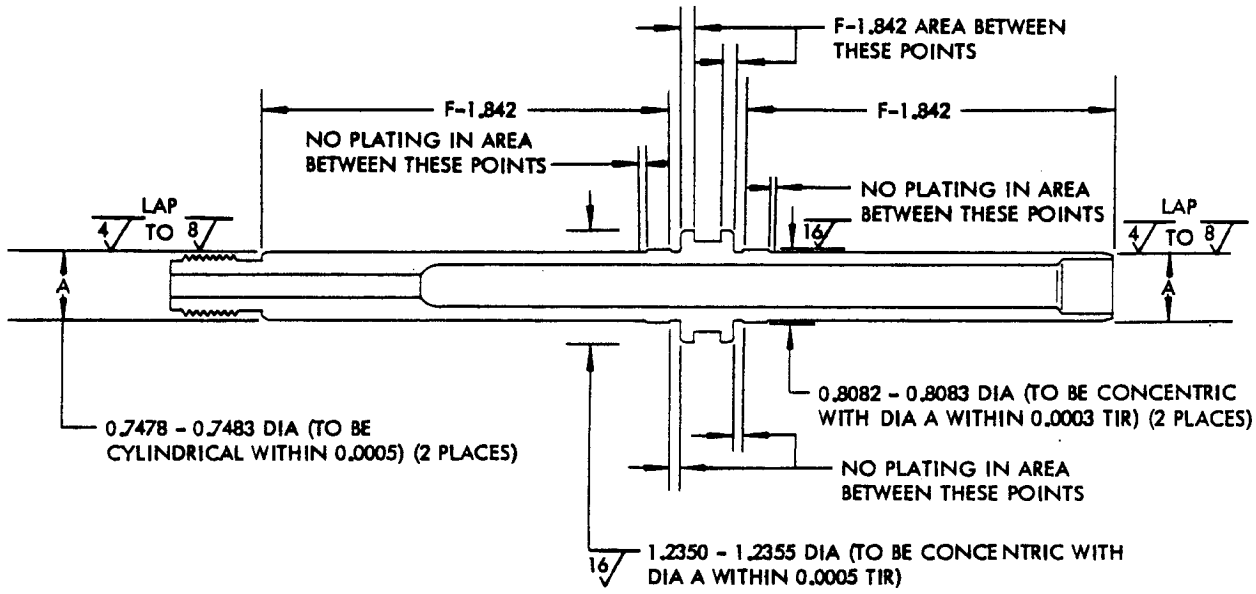
ALL DIMENSIONS ARE IN INCHES

Refinish Diagram
Figure 401 (Sheet 1)

1560758

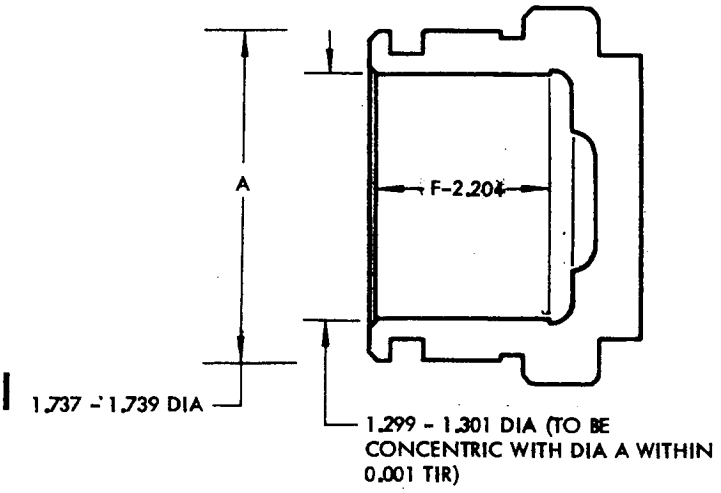


PISTON (85, FIGURE 1101, 65-44666-1)

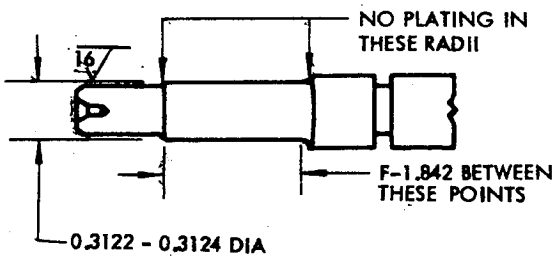


PISTON (85, FIGURE 1101, 65-44673-1, 65-44773-1)

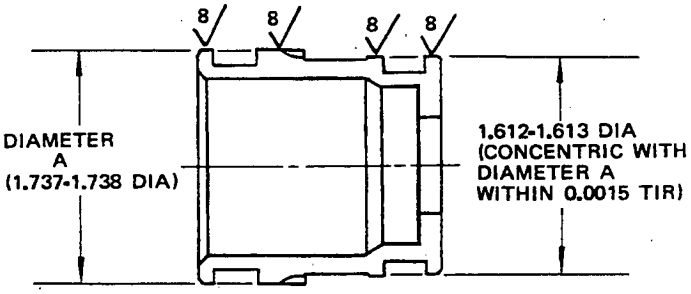
NOTE: ALL DIMENSIONS ARE IN INCHES



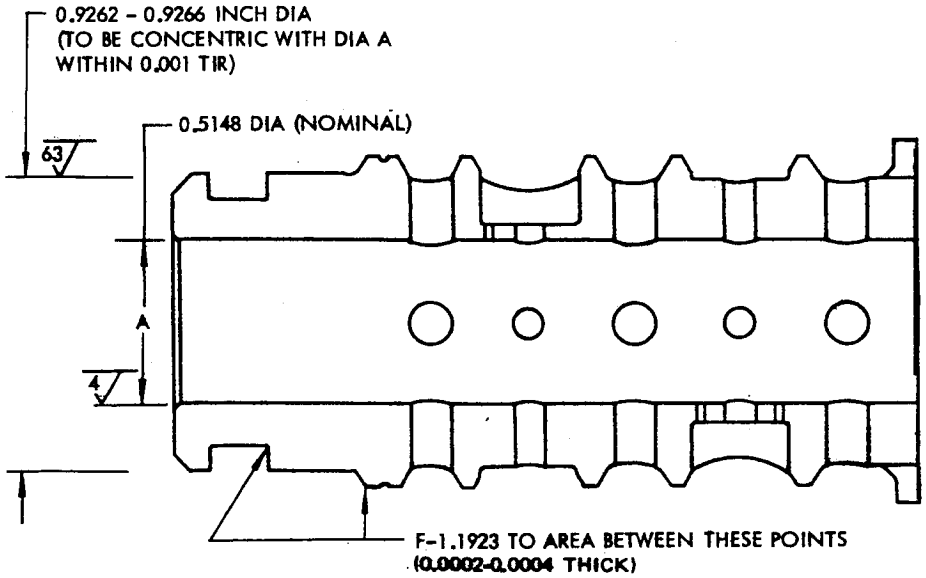
RETAINER (94, FIGURE 1101) (65-44671-8, -9, -10)



SHAFT (99, FIGURE 1101) (65-44761-8, -9, -10)

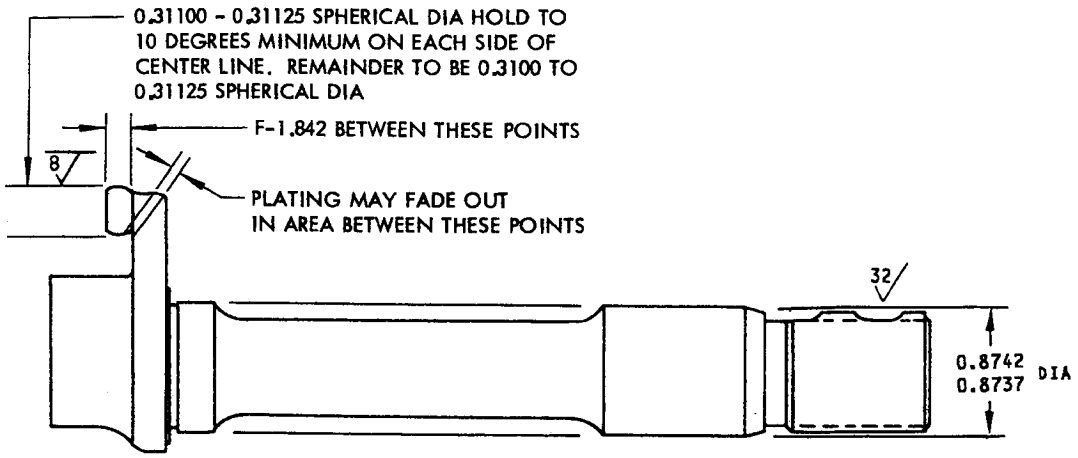


PISTON (112, FIGURE 1101) (65-44761-8, -9)

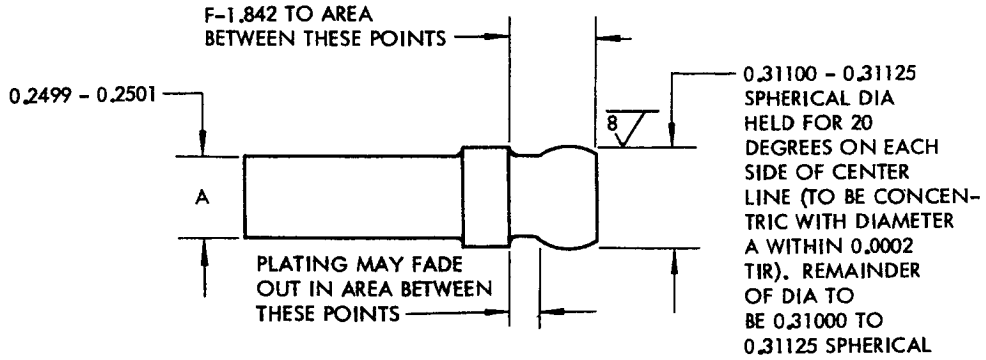


SLEEVE (14, FIGURE 1102)

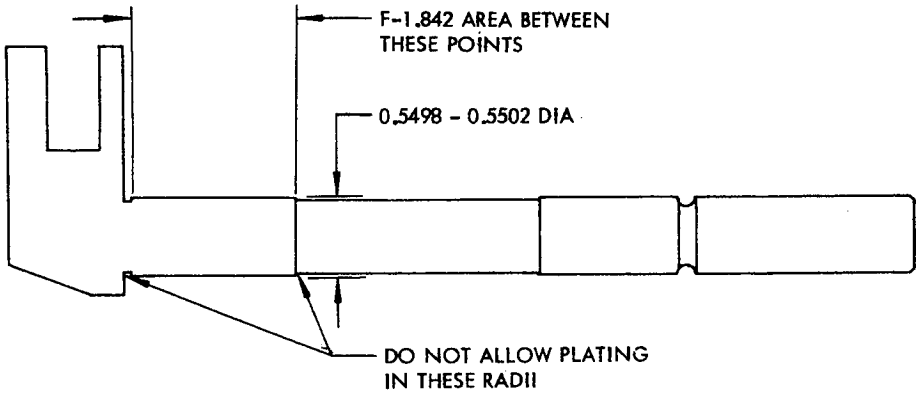
NOTE: ALL DIMENSIONS ARE IN INCHES



SHAFT (2, FIGURE 1103)



BALL (4, FIGURE 1103)



SHAFT (6, FIGURE 1103)

NOTE: ALL DIMENSIONS ARE IN INCHES

Refinish Diagram
Figure 401 (Sheet 4)

3. Replacement

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

B. Refer to Materials in par. 4. for repair materials required.

C. Replacement of components for Power Control Unit Assembly (Fig. 1101).

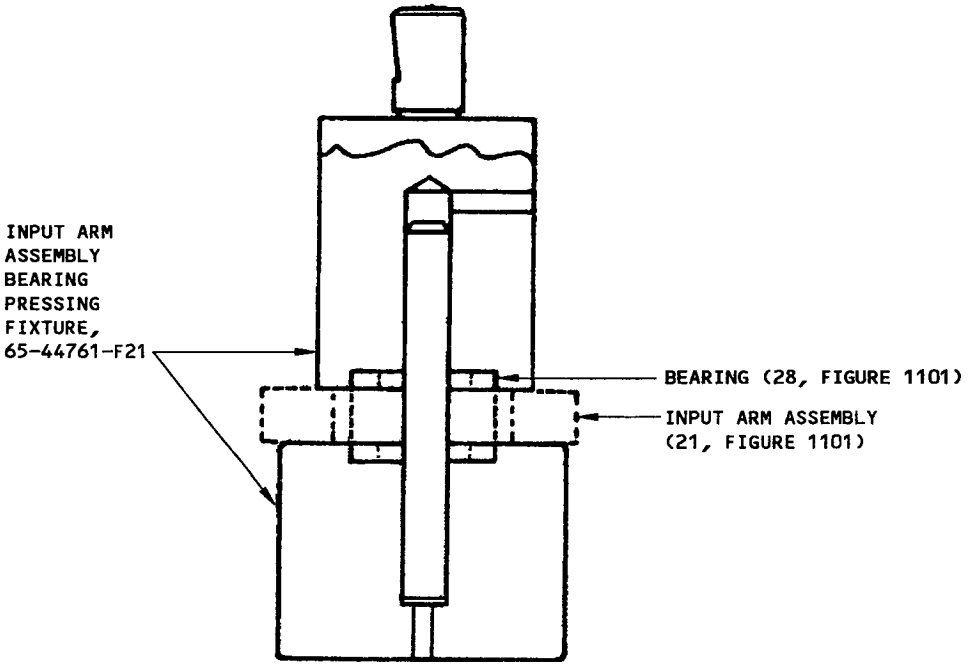
(1) Nameplate (5)

(a) If necessary, remove strap (4) and using a knife or suitable tool remove nameplate (5). Removal of nameplate (5) may be facilitated by brushing TURCO 4669 along parting line as nameplate is pried loose.

(b) Steel stamp the appropriate information on new nameplate (5) before installation. On unit which has been repaired using a steel sleeve manifold, stamp SS on nameplate after serial number.

(c) Clean faying surfaces and bond nameplate in accordance with 20-50-12, Type 38. Clamp nameplate (5) into position shown with straps (4).

(2) Remove and replace bearing (28) per 20-50-03. Input Arm Pressing Fixture, 65-44761-F21 may be used to facilitate installation (Fig. 402). When installed, bearing must rotate with torque of less than 0.75 ounce-inch. Refer to Repair, par. 3.C(3) for replacement and to Testing, par. 12.J for repair and calibration of arm.

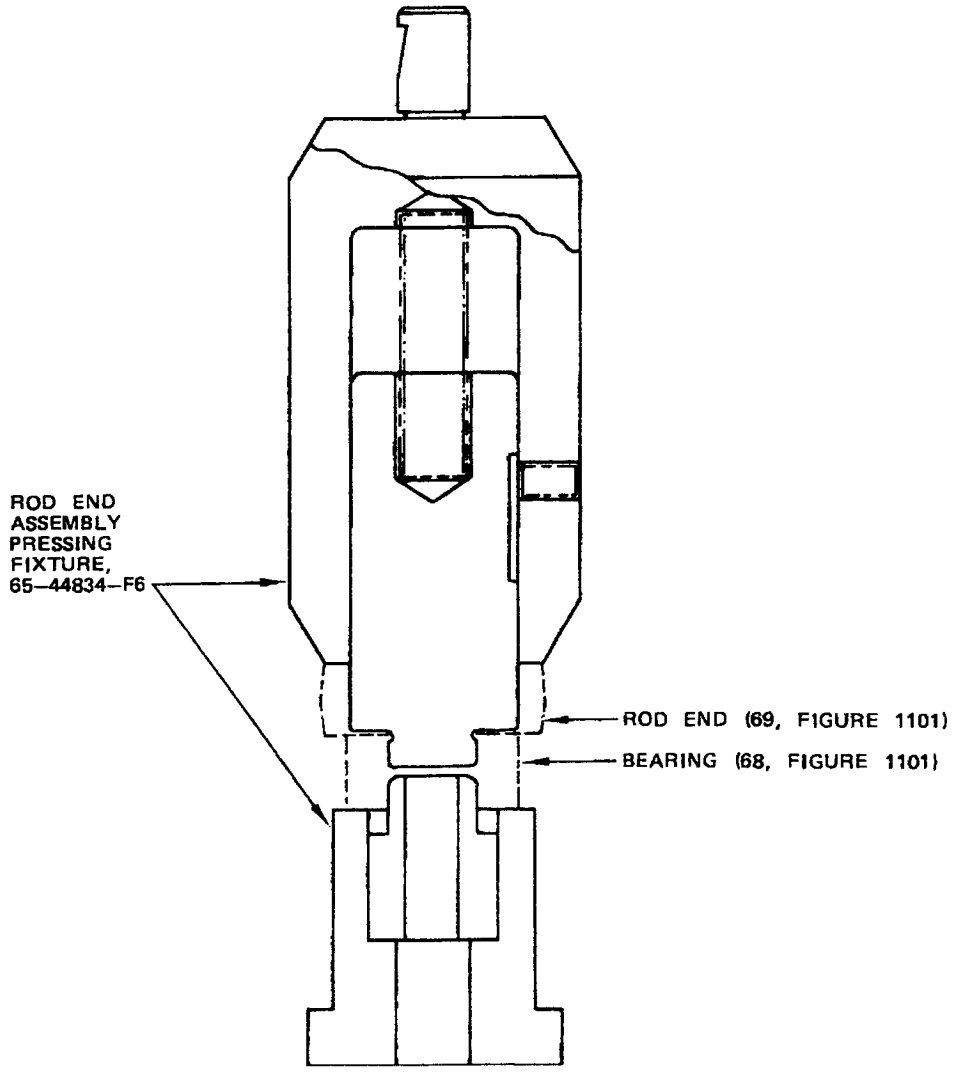


Installation of Bearing (28)
Figure 402

(3) Replace input arm assembly (21) as a complete assembly. Arms (22, 23), washers (24) and rivets (25, 26) are bonded and machined after bonding. Machine 0.997-1.003 inch diameter bore to 1.2492-1.2496 inch diameter per SOPM 20-10-02, in preparation of installation of bearing (28) per Repair, par. 3.C(2). Magnetic particle examine per SOPM 20-20-01 after machining. Refer to Testing, par. 12.J for repair and calibration of arm. (Material: Arm (22, 23), 17-4PH CRES 180-200 ksi).

CAUTION: INPUT ARM ASSEMBLY (21) IS MATED WITH A POWER CONTROL UNIT AS A MATCHED SET. REFER TO TESTING SECTION, PAR. 12.J FOR REPAIR (FIG. 721A) AND CALIBRATION (FIG. 720, 721) OF A NEW ARM.

(4) Remove and replace bearing (68) per SOPM 20-50-03. Rod end assembly pressing fixture, 65-44834-F6 may be used to facilitate installation (Fig. 403).



Installation of Bearing in Rod End
Figure 403

(5) Replacement of components of arm assembly (113).

(a) Using a drill, remove staked end of rivet (114). Remove rivet, washer (115), bushing (116), clevis (117), and arm (118).

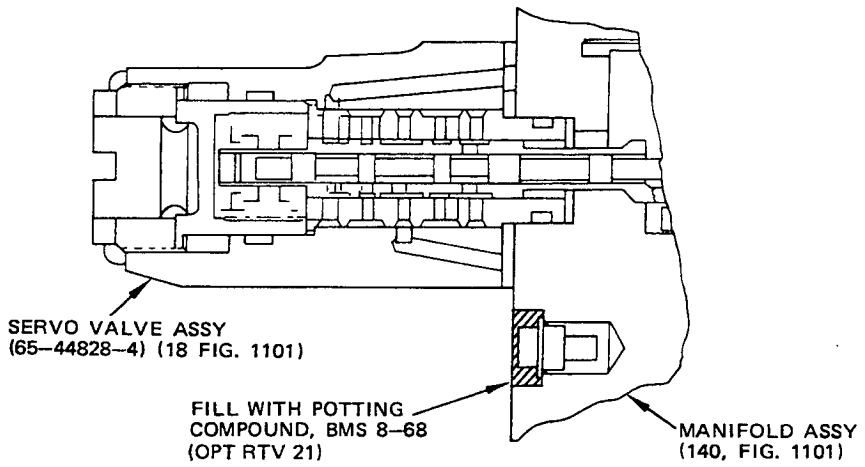
(b) Position arm (118) in fork of clevis (117) with the clevis rod slot provided for locking device (101) located on the right side.

NOTE: View assembly from clevis end.

(c) Press bushing (116) into clevis (117), and install rivet (114) with head on same side as locking slot in clevis rod. Install washer (115) and upset rivet to diameter of 0.21-0.28 inch.

(6) (For 65-44761-8, -9, -10, -14, -17, -20) Replacement of Servo Valve Assembly 65-44828-2 (Fig. 1102)

(a) If Servo Valve Assembly 65-44828-2 is replaced by 65-44828-4, fill unused receptacle cavity in manifold assembly with potting compound BMS 8-68 (optional potting compound RTV 21). Wipe excess compound flush with outer surface of manifold (Fig. 403A).



Cavity Potting Details
Figure 403A

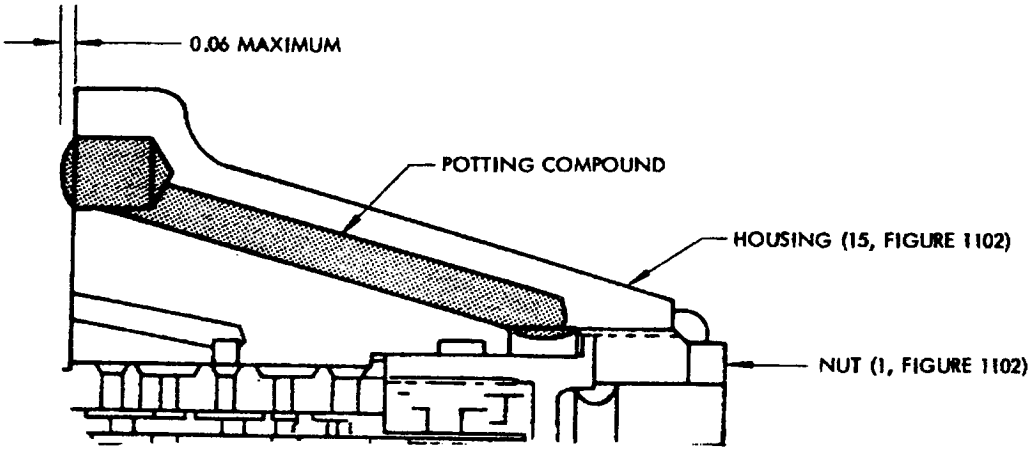
D. (For 65-44828-2) Replacement for components of Servo Valve Assembly (Fig. 1102)

(1) If necessary, remove potting compound from wire passage of housing (15).

(2) Clean the surfaces of the wire cavity in accordance with 20-30-03 using solvent BMS 3-2, Type 1.

(3) Fill wire passage with BMS 8-68 potting compound as shown in Fig. 404. Prepare BMS 8-68 potting compound in accordance with REPAIR, par. 3.F.(3)(p).

NOTE: Servo Valve Assembly 65-44828-2 can be replaced by the 65-44828-4 when wire passage on housing (15) is filled.



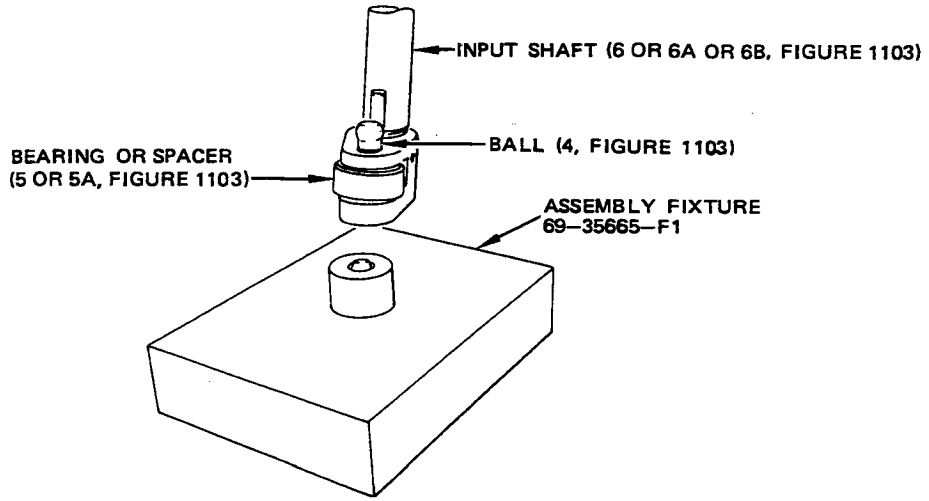
Potting of Servo Valve Assembly Cavity
Figure 404

E. Replacement Components for Input Shaft Assembly (Fiig. 1103)

(1) Shaft (2) and shaft assembly (3 or 3A) composed of ball (4), bearing (5) or spacer (5A), and shaft (6 or 6A or 6B) are matched sets and must be replaced as a complete serialized set if shaft (2) or shaft (6 or 6A or 6B) are replaced.

(2) If ball (4) or bearing (5) or spacer (5A) require replacement, drill staked end of ball (4), remove ball (4) and bearing (5) or spacer (5A).

(3) Install new bearing (5) or spacer (5A) and ball (4). Using Input Shaft Assembly Fixture, 69-35665-F1 stake ball (4) to a diameter of 0.26-0.34 inch and flush with the surface of shaft (6 or 6A or 6B) within 0.05 inch (Fig. 405).



Replacing Bearing and Ball in Input Shaft Assembly
Figure 405

F. Replacement of components of End Fitting Assembly (Fig. 1104)

(1) Replacement of bushings (10).

(a) If necessary, use End Fitting Arbor Press Fixture, 69-35660-F1 to remove bushings (10).

(b) Apply BMS 10-11, type 1 primer to the faying surfaces of bushings (10) and fitting (13) and using End Fitting Arbor Press, 69-35660-F1 install bushings (10) while primer is still wet.

(c) Machine ID of bushings (10) to a diameter of 0.4996-0.5000 inch in line within 0.0001 inch. Surface finish must be 32 microinches or better.

(d) Machine flanges of bushings (10) to a perpendicular distance of 1.500-1.505 inch. Flange surface finish must be 32 microinches or better.

(2) (For 69-35660-1 only) Replacement of inserts (11 or 12).

(a) Remove insert (11 or 12). 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 3/4-1-1/2 turns below top surface of hole. Remove tang.

(3) (For 69-35660-1 only) Replacement of electrical components (Ref 20-11-02).

(a) Remove screws (1) releasing receptacle assembly (2). Remove potting compound from receptacle assembly and unsolder wires from contacts of receptacle (2).

(b) Using a suitable chisel, carefully remove retainer ring (3), releasing plug assembly (4) and remove contacts from plug assembly, using Contact Extraction Tool, 000407-004.

(c) Remove wires (6, 7, 8, 9), tubing (5), and potting compound from cavity in fitting (13). A handheld twist drill may be used to remove potting compound.

CAUTION: EXERCISE CARE TO PREVENT DAMAGE TO SURFACES OF END FITTING.

(d) Clean wiring cavity in accordance with 20-30-03 using solvent BMS 3-2, type 1.

(e) Using Contact Crimp Tool 000407-0001, install new wires (6, 7, 8, 9) in contacts of plug assembly (4) in accordance with wiring diagram (Fig. 406).

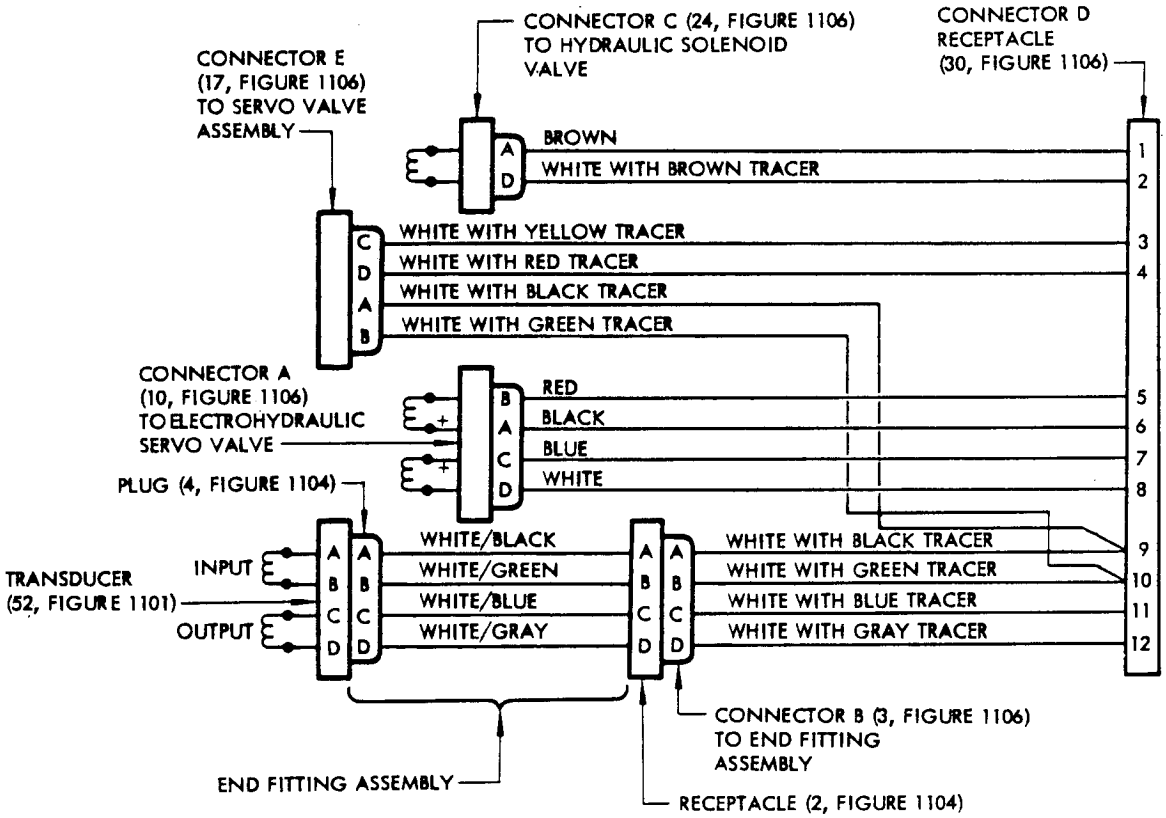
(f) Using Contact Crimp Gage 000407-0002 to check size of crimped contact.

(g) Install tubing (5) on each contact, shrink tubing and using Contact Insertion Tool 000407-0003 insert contacts in plug assembly (4).

(h) Thread wires through appropriate passages and position plug (4) in fitting (13). Extend wires from hole for receptacle assembly (2).

(j) Trim wires (6, 7, 8, and 9) to a length of approximately two inches beyond face of fitting (13).

(k) Slide tubing (5) on each of wires, connect and solder each wire to the proper contacts of receptacle (2) in accordance with wiring diagram (Fig. 406). Slide tubing (5) over solder joints and shrink in place.



65-44761-8, -9, -14, -17, -20

Schematic Wiring Diagram
Figure 406

(m) Perform continuity and dielectric strength test in accordance with TESTING, par. 4.

(n) Upon successful completion of continuity and dielectric strength tests, secure plug (4) with retainer (3).

(o) Wipe a light coat of primer BMS 10-11, Type 1 on the countersunk face of screws (1) and secure receptacle (2). Do not allow primer on screw threads.

NOTE: Orient receptacle key to the left, as viewed facing the end fitting assembly mounting face.

(p) Apply potting compound.

1) Prepare for BMS 8-68 potting compound in accordance with BAC5550 (RTV21 optional potting compound).

2) Using suitable equipment, subject compound to a vacuum of at least 25 inches of mercury until foaming slows to a gentle boil. Keeping temperature of compound above the dew point, release vacuum to collapse excess foam.

3) Inject compound through the charging hole until wiring cavities are completely filled. Excess compound must be wiped flush to outer surface of unit.

4) Cure compound at either 24 hours at room temperature, 9 hours at 100°F or 4 hours at 150°F. Hold material at room temperature for 30 minutes minimum prior to elevated temperature.

G. To replace the components of the Hydraulic Solenoid Control Valve Assembly (7, Fig. 1101), refer to the manufacturer's overhaul manual.

H. Replacement of components of Manifold Assembly (Fig. 1106)

(1) (For 65-44836-1, -17, -19 only) Replacement of electrical components (Fig. 406).

NOTE: Refer to 20-11-02.

(a) Remove screws (29), releasing receptacle (30).

(b) Remove potting compound from receptacle (30).

(c) Using Contact Removal Tool 294-89, extract contacts from receptacle (30).

(d) Remove retainer rings (4, 11, 18, 25) releasing plug assemblies (10, 17, 24).

(e) Remove potting compound from plug assemblies. Using Contact Extraction Tool 000407-0004, remove contacts from plug assemblies (10, 17, 24).

(f) Using a handheld twist drill, carefully remove wires (6, 7, 8, 9, 13, 14, 15, 16, 20, 21, 22, 23, 27, 28) and potting compound from manifold cavities.

CAUTION: USE CARE TO PREVENT DAMAGE TO MANIFOLD (37).

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

(h) Clean wire passages in accordance with 20-30-03 using solvent BMS 3-2, type 1.

(i) Using Contact Crimp Tool 000407-0001, crimp wires (6, 7, 8, 9, 13, 14, 15, 16, 20, 21, 22, 23, 27, 28) to contacts of plug assemblies (3, 10, 17, 24) according to the color coding.

(j) Using Contact Crimp Gage 000407-0002, check size of each crimped area. Install and shrink tubing (5, 12, 19, 26).

(k) Using Contact Insertion Tool 000407-0003, install contacts in plug assemblies (3, 10, 17, 24).

(l) Insert wiring and plug assemblies into applicable cavities in manifold. Bring ends of wires out through receptacle mounting hole.

(n) Trim wires to project approximately 2 inches beyond receptacle mounting face.

(o) Prepare dual wires leading to contacts 9 and 10 of receptacle (30).

1) Remove a minimum number of strands, evenly spaced, from each wire to allow insertion into the contact. Do not remove more than one third of the strands from each wire.

2) Place wires together and twist strands together. Place a one-quarter inch length of thermofit sleeving over the two wires and shrink into place.

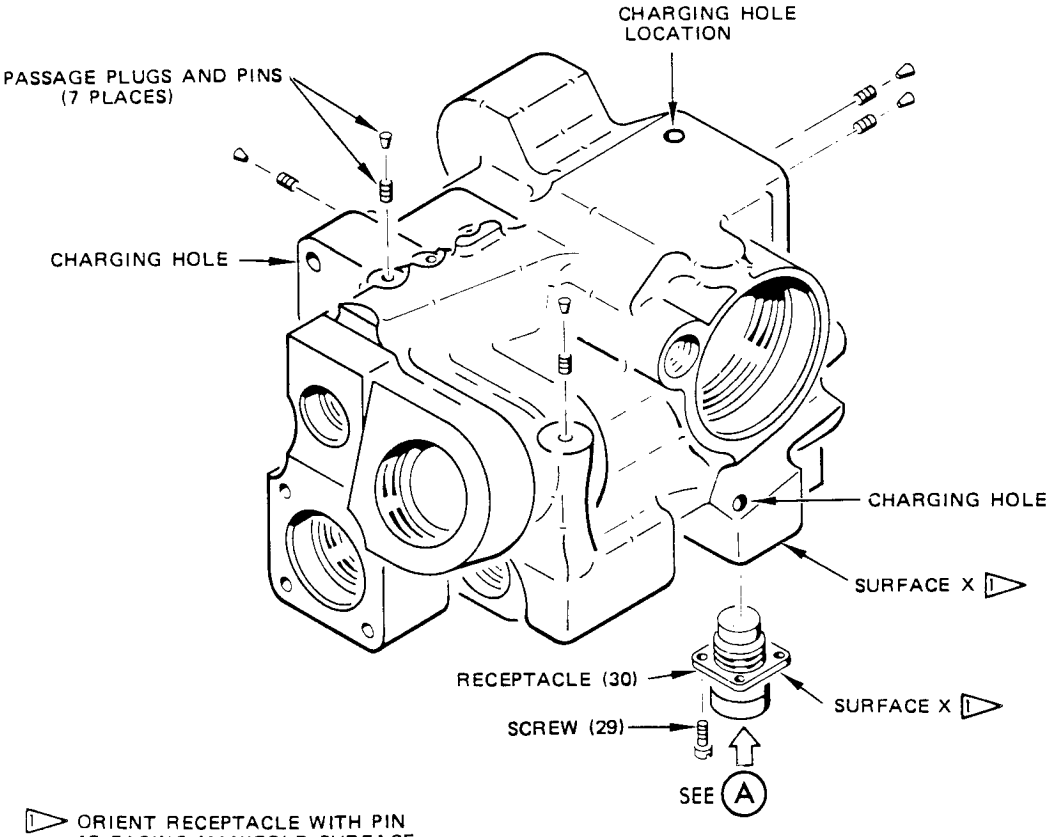
(p) Using Contact Crimp Tool 294-90, secure wires to contacts of receptacle (30) and use Contact Insertion Tool 294-88, insert contacts in receptacle (30).

(q) Perform wiring continuity and dielectric strength test in accordance with TESTING, par. 11.

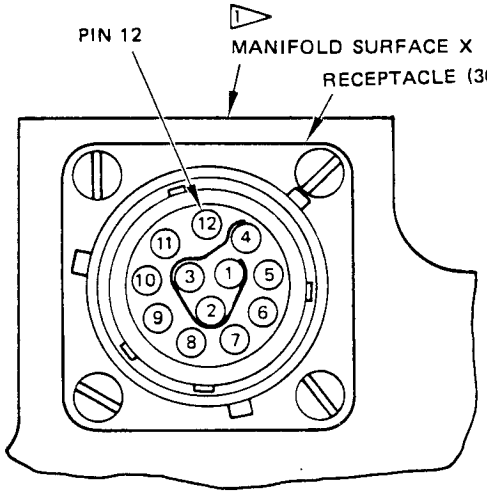
(r) Upon successful completion of continuity and dielectric strength tests, secure plug assemblies (3, 10, 17, 24) with rings (4, 11, 17, 25).

(s) Position receptacle ,(30) with pin number 12 (connector D) oriented toward referenced side of manifold as shown in Fig. 408. Secure receptacle assembly (30) with screws (29).

(t) Apply BMS 8-68 potting compound in accordance with par. 3.F.(5)(p), through charging holes (Fig. 408).



1 ORIENT RECEPTACLE WITH PIN 12 FACING MANIFOLD SURFACE X AS SHOWN



RECEPTACLE ASSY (30) INSTALLED

A

NOTE: ITEM NUMBERS REFER TO FIG. 1106

65-44836-1, -17, -19

(2) Replace pins (31) and plugs (32) in accordance with 20-50-04.

(3) If inserts (33, 34, 35, or 36) require replacement, install per par. 3.F.(4).

(4) (For 65-44836-1, -17, -19 only) Replacement of bushing (1) and plate (2).

(a) Use a suitable puller to remove bushing (1). Extract plate (2). Clean cavity and check for damage to bore.

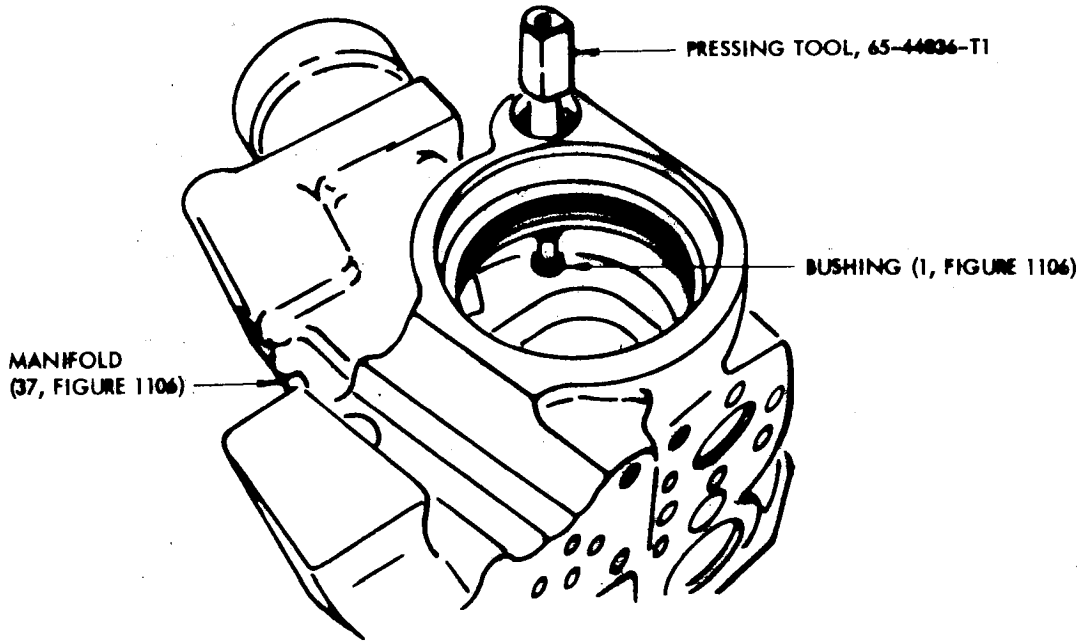
(b) Install plate (2).

(c) Apply primer BMS 10-11, type 1 to the outside surface of bushing (1). Using Pressing Tool 65-44836-T1, install bushing while primer is wet (Fig. 409).

(d) Machine bore of bushing (1) to a diameter of 0.2498-0.2501 inch, concentric to the outside bearing bore diameter within 0.0002 inch and finish of 32 microinches.

(e) Check that installed length of bushing (1) is 0.465-0.471 inch. If necessary to machine the end face of bushing, do not remove more than 0.020 inch.

(f) Clean manifold cavity thoroughly to remove any particles from the machining.



65—44836—1, —17, —19

Installation of Bushing for Eccentric Shaft
Figure 409

I. Replacement of components of manifold assembly (Fig. 1106A)

(1) Replacement of fixed resistor (20)

(a) Remove Pin (10) and Plug (15).

(b) Remove Resistor (20) using installation/extraction tool P/N CUTA1870104C.

(c) Clean internal passages to remove debris in accordance with SOPM 20-30-03.

(d) Install Resistor (20) using installation/extraction tool P/N CUTA1870104C.

(e) Install Pin (10) Plug (15).

NOTE: Replacement of Resistor JETA1875500D with Resistor JETX0527100B is required per service letter 737-SL-27-71 and Airworthiness Directive AD-97-05-09. Affected units are PSU assemblies 65-44761-21 with the serial numbers listed below. It is recommended to mark the nameplate of the PSU assembly with a "B" after the serial number to indicate that the replacement has been accomplished.

P/N 65-44761-21 Serial Numbers:

8549A
8550A
8552A
8556A
8557A
8561A
8563A through 8718A
8720A through 8726A
8728A through 8745A
8749A
8750A through 8758A
8760A through 8873A
8876A through 9004A
9007A through 9012A
9014A through 9040A
9042A through 9066A
9068A through 9340A
9342A through 9388A
9390A through 9529A
9531A through 9676A
9678A through 9688A

(2) Replacement of fixed resistor (20, P/N JETX0527100B) with 0.010 inch oversized resistor.

(a) Remove pin (10) and plug (15).

(b) Remove resistor (20).

(c) Machine bore for resistor (20), 0.010 inch oversize to 0.1980-0.1975 inches, maintain hole depth of 0.95 inches.

(d) Machine bore for plug (15), 0.010 inch oversize to 0.2917-0.2912 inches, maintain hole depth of 0.28 inches.

(e) Machine a 40-50 degree chamfer between the 0.1980-0.1975 inch bore and the 0.2917-0.2912 inch bore.

(f) Penetrant check machined area per SOPM 20-20-02.

(g) Clean internal passages to remove debris in accordance with SOPM 20-30-03.

(h) Install oversized resistor P/N JETX0527200B.

(i) Install oversized plug BACP20AX25DAX.

(j) Install pin (10).

4. Materials

A. Solvents

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

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

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

(4) Paint Remover, Turco 4669 -- Turco Products Inc., 24600 S. Main, Los Angeles, California 90746

(5) Perchloroethylene, Technical Grade Federal Specification 0-T-236 -- Source optional

(6) BMS 3-2, Type 1 -- (SOPM 20-60-01)

B. Lubricant

(1) Grease, Skydrol MCS352 -- Monsanto Co., Inc., St. Louis, Missouri

(2) Hydraulic Fluid, BMS 3-11 -- (SOPM 20-60-03)

(3) Grease, Batco 8401, Type 1 or 2 -- Battenfeld Grease and Oil Corp., Box 144, 1174 Erie Avenue, North Tonawanda, New York 14120

C. Adhesives

(1) Epon 901 with Catalyst B-1 -- Shell Chemical Co., Willow Pass Road, P.O. Box 831, Pittsburgh, California 94565

D. Potting and Sealing Compounds

(1) Sealant -- RTV 601 (SOPM 20-60-04)

(2) Sealant -- 30-121 (SOPM 20-60-04)

(3) Potting Compound -- BMS 8-68 (SOPM 20-60-04)

(4) Potting Compound -- RTV 21, General Electric Company, Silicone Products Division, Waterford, New York 12188

E. Miscellaneous Materials

(1) Abrasive Paper 400 grit or finer, 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) Lockwire, MS20995NC32 -- Source optional

(5) Tubing, Thermofit RFN100 -- Rayclad Tubes Inc., Oakside Ave - Northside Ave., Redwood City, California 94063

(6) Primer, BMS 10-11, Type 1 - - Source optional

ASSEMBLY

1. General

   A. Prior to assembly, lubricate all seals and internal parts with hydraulic fluid, BMS 3-11 or lightly lubricate with Skydrol assembly lube MCS352, unless otherwise noted.

   B. Refer to 20-50-06 for installation of O-rings and teflon seals.

   C. Install countersunk washers with countersunk side next to bolthead.

   D. Refer to 20-50-03 for bearing installation and retention.

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

   F. Use designated Special Tools Fixtures and Equipment, or equivalent, to perform assembly operations.

2. Assembly

   A. To assemble the Hydraulic Solenoid Control Valve Assembly (7, Fig. 1101), refer to the manufacturer's overhaul manual.

B. Assemble Servo Valve Assembly (Fig. 1102)

(1) Install rings (3) and packing (4) in housing (15).

(2) Install slide (12) in housing sleeve (13) being careful to orient slide (12) as shown (Fig. 505, 505A).

NOTE: End flat area of slide (12) must face away from the flange side of housing (15).

(3) Install seat (9), spring (8), and guide (7). Using Assembly Tool 65-44671-F7, depress guide (7) and install keeper (6) (Fig. 105).

(4) Install spring (5), retainer (2).

(5) Apply a light coating of grease Batco 8401, Type 1 or 2 to housing (15) cavity and to faying surface of housing.

(6) Install nut (1) and using Torque Fixture 65-44828-F3A and Torque Wrench Adapter 65-44828-F2, tighten 275-288 lb-in. (Fig. 104).

(7) Wipe off excess grease and clean contact lines between nut (1) and housing (15) and between nut and retainer (2) with MEK. Apply a bead of sealant BMS 5-26, Type 2, Class B-2 to contact lines between nut and housing and between nut and retainer (2). Allow sealant to cure and check that it has bonded to the surfaces.

(8) Install slide (11) in slide (12) (Fig. 505, 505A).

CAUTION: SLIDE (11) MUST BE INSERTED CORRECTLY INTO SLIDE (12). BEVELED SIDE OF END OF SLIDE (11) MUST FACE FLAT END AREA OF SLIDE (12) (FIG. 505). INCORRECT ALIGNMENT OF LARGE HOLES IN ENDS OF SLIDES WILL CAUSE INCORRECT ENGAGEMENT OF SHAFT (34, FIG. 1101) DURING OPERATION OF UNIT.

NOTE: Sleeve (13) and slides (11, 12) are precision matched sets. They must be mated as serialized to obtain proper fit.

C. Assemble Power Control Unit (Fig. 1101)

(1) Use Seal Insertion Tool AT 83333, to install packing (38) and ring (37) in manifold assembly (140) (Fig. 502). O-ring packing (38) and channel seal ring (37) are paired into sets as follows (parts must not be interchanged):

(a) Channel seal ring (37) BACR12AT212 and square O-ring packing (38) BACP11W212 (preferred).

(b) Channel seal ring (37) BACR12BD212NA and O-ring packing (38) NAS1611-212 (optional to (a)).

(c) Channel seal ring (37) BACR12AT212 and O-ring packing (38) NAS1611-212 (optional to (b)).

NOTE: Channel seal (37) BAC12AT212 may be notched radially 0.020-0.040-inch wide by 0.003-0.005-inch deep in 4 places on one end face. Notches must be installed inboard.

(2) Install bearings (35, 36) (Fig. 503)

(a) Slip bearing (36) onto shaft of Bearing Assembly Fixture 65-44761-F12.

(b) Insert shaft and bearing into manifold. Place bearing (35) over end of bearing assembly fixture shaft and align with recess in manifold (37, Fig. 1106).

(c) Slide retaining yoke into lands on end of fixture shaft as shown.

(d) Check that each bearing is centered with its seat, and rotate hand knob to press bearings (35 and 36) simultaneously into place. Apply only sufficient pressure to seat bearings with a light press fit.

(e) Remove Fixture 65-44761-F12 and check that bearings are seated properly.

(3) (On 65-44761-8, -9, 14, -17, -20), install arm assembly (113).

(a) Slide arm assembly (113) through opening provided for piston (112).

(b) Orient arm assembly (113) with heel of arm (118) toward receptacle (30, Fig. 1106).

(c) Twist arm assembly (113) through approximately 180 degrees, as final location is approached, for final position of arm (118) (Fig. 504).

(d) Install packing (98) on shaft (99).

(e) Install shaft (99), plate (97).

(f) Thread plug (96) to engage approximately 2 threads and apply a light coating of grease, Batco 8401, Type 1 or 2 to exposed threads of plug. Tighten plug (96) finger tight.

NOTE: Plug (96) will be tightened to 95-105 lb-in. during functional test.

(4) Install input shaft (2, Fig. 1103).

(5) Install rings (16), packing (17), and plate (15) on servo valve (18). Apply sufficient assembly lube, MCS352 to fill cavity between center hole of plate (15) and valve body. Wipe off excess lube.

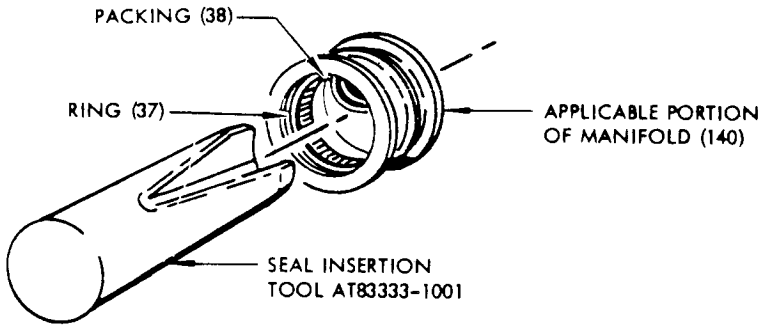
WARNING: SERVO VALVE (18) MUST BE CORRECTLY POSITIONED ON MANIFOLD. FLANGE SIDE OF SERVO MUST FACE AWAY FROM INPUT CAVITY (PORT) ON MANIFOLD. IMPROPER ORIENTATION OF SERVO WILL CAUSE DANGEROUS HYDRAULIC MALFUNCTION.

(6) Position servo valve (18, Fig. 1101) on manifold (140, Fig. 1101).

NOTE: Position servo correctly by locating lockwire hole on servo housing flange away from input cavity on manifold (Fig. 507).

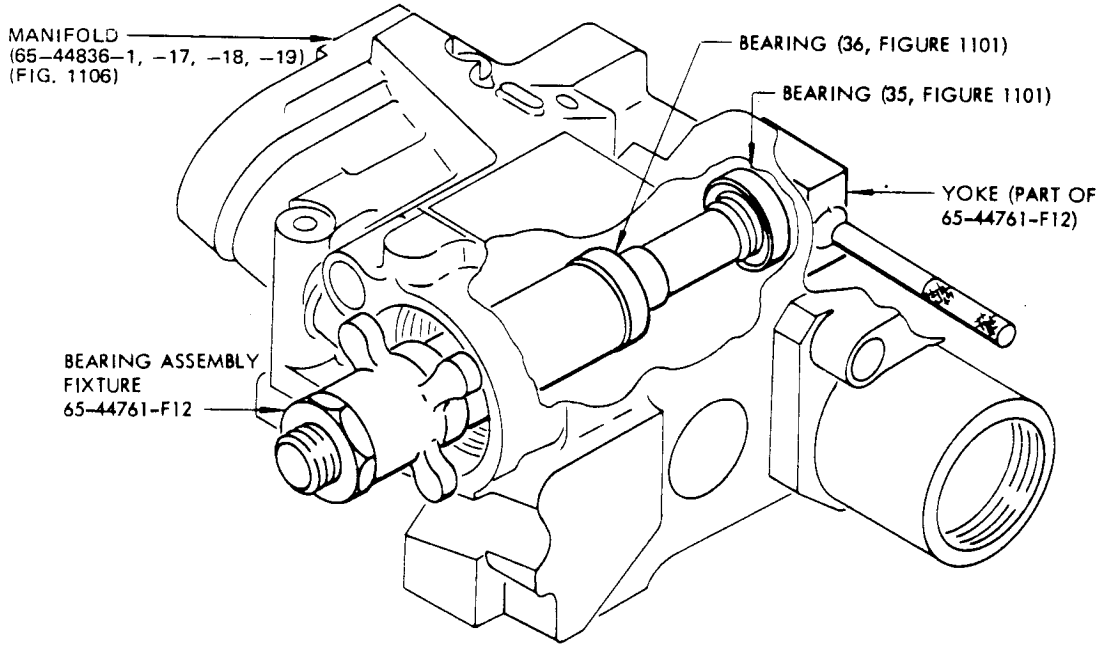
(7) Engage secondary slide (12, Fig. 1102) on driving ball of outer shaft (2, Fig. 1103) (Fig. 505, 505A)

(8) Secure servo valve (18) with bolts (14), and tighten to 70-90 lb-in.

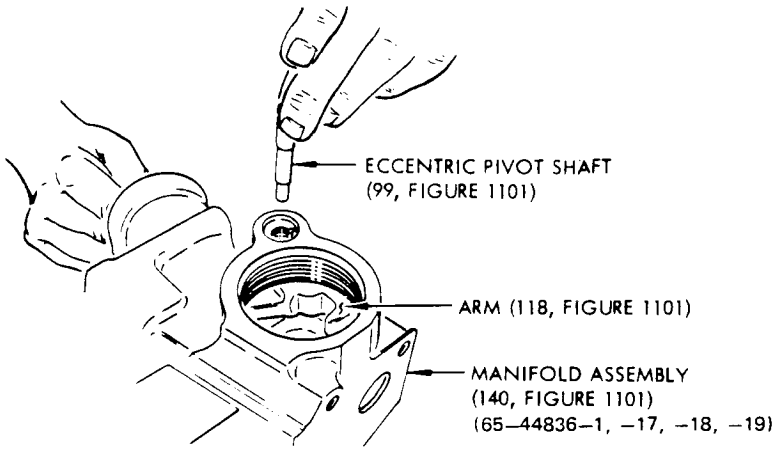


NOTE: PART INDEX NUMBERS APPLY TO FIGURE 1101

Use of Seal Insertion Tool
Figure 502



Installing Bearings For Input Shaft Assembly
Figure 503



Installing Arm Assembly
Figure 504

(9) Install packing (27) on inner shaft (3, Fig. 1103) and install shaft. Engage ball of shaft with hole in primary slide (11, Fig. 1102) (Fig. 505A).

(10) Position shaft (3, Fig. 1103) and install pins (29).

NOTE: If pin (29) has excessive play, replace with applicable optional oversize pin (Fig. 1101).

(11) On 65-44761-8, -9, -14, -17, -20, assemble seal assembly parts (104 thru 111) on piston (112) (Fig. 505B).

(12) On 65-44761-8, -9, -14, -17, -20, install piston (112) and assembled seals.

(13) On 65-44761-8, -9, -14, -17, -20, install spring (103) and guide (102).

(14) On 65-44761-8, -9, -14, -17, -20, using Autopilot Spring Guide Wrench 65-44761-F13, tighten guide (102) until recessed 1/2 inch from face of manifold into cavity (Fig. 601).

(15) On 65-44761-8, -9, -14, -17, -20, install lock (101), nut (100), and tighten nut snugly.

NOTE: Nut is tightened to 30-40 lb-in. during functional test.

(16) On 65-44761-8, -9, -10, -14, -17, -20, install packing (95) on retainer (94) and install in manifold (37, Fig. 1106).

(17) Thread retainer (94) to engage approximately 2 threads and apply a light coating of grease, Batco 8401, Type 1 or 2 to exposed threads of retainer. Then tighten retainer snugly.

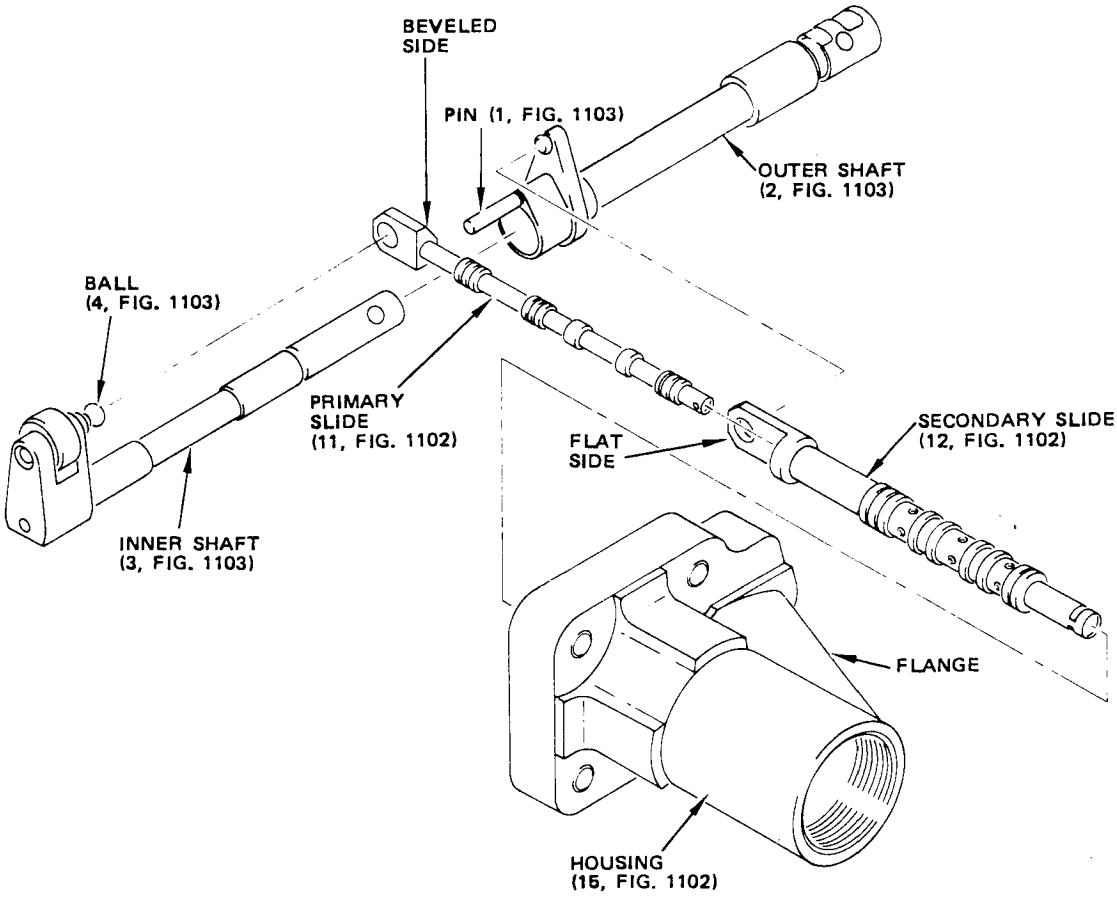
NOTE: Retainer is tightened to 145-160 lb-in. during functional test.

(18) Preassemble parts on piston (85).

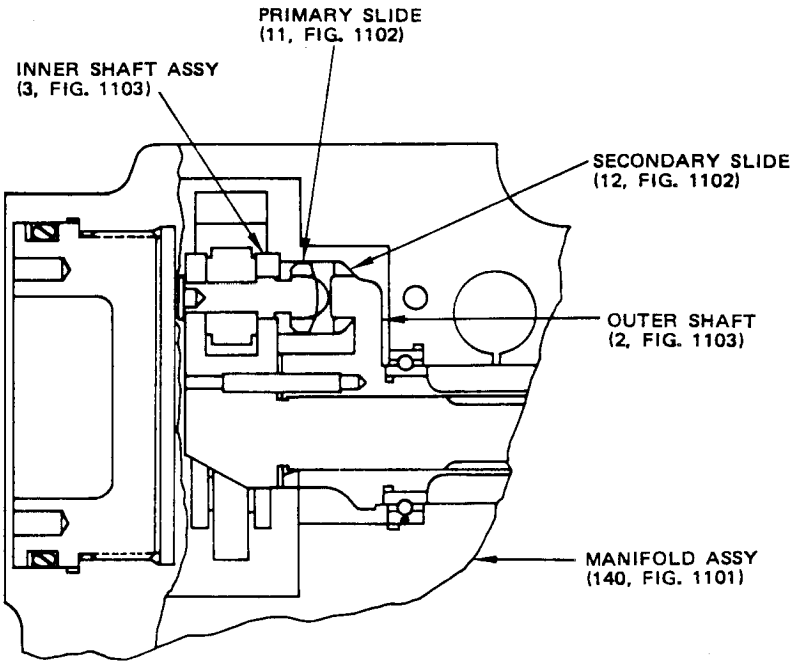
(a) Install seal (75) and packing (76), or seal assembly (74A), in bearing (80) per 20-50-06. If you are using seal assembly (74A) S34852-210H5 also follow the instructions in Figure 505E.

(b) Install piston seal ring (79) on bearing (80). When using optional packing (79), fill groove within one quarter turn with a continuous spiral of packing. Trim OD of packing such that a force of 10-50 pounds is required to slide bearing into cylinder bore.

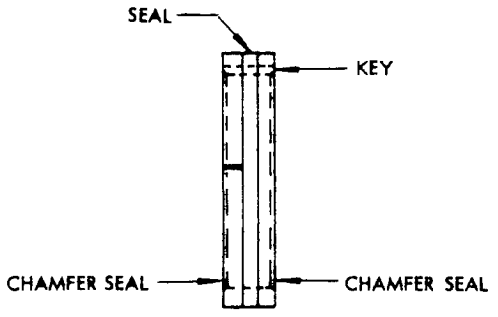
CAUTION: MAKE SURE THAT SCRAPER (73) IS POSITIONED BETWEEN RETAINER (74) AND FLANGE (66) OR SCRAPER DAMAGE AND MALFUNCTION OF UNIT MAY OCCUR.



Slide and Shaft Orientation
Figure 505



Slide and Shaft Installation
Figure 505A



TYPICAL PISTON SEAL ASSEMBLY INSTALLATION

Installation of Piston Seal Assemblies
Figure 505B

(c) Install rings (77) and packing (78) on bearing (80). Slide bearing (80), retainer (74), scraper (73) and flange (66) onto piston (85) (Fig. 505C).

(d) On 65-44761-8, -9, -14, -17, -20, slide transducer probe (52) into piston rod (85). Thread rod end assembly (67) on piston rod (85) to engage approximately 2 threads and apply a light coating of grease, Batco 8401, Type 1 or 2 on exposed threads of piston rod. Using torque wrench adapter 65-44761-F14 tighten to 162-200 lb-in. (Fig. 101).

(e) On 65-44761-10, if piston (85, 65-44666-1 or 65-44673-1) is used, install spacer (85A) in rod end assembly (67). Thread rod end assembly (67) on piston rod (85) to engage approximately 2 threads and apply a light coating of grease, Batco 8401, Type 1 or 2 on exposed threads of piston rod. Using torque wrench adapter, 65-44761-F14 tighten to 162-200 lb-in. (Fig. 101).

(f) Wipe off excess grease from rod end assembly (67) and clean contact area and keyway with MEK. Then apply a bead of sealant, BMS 5-26, type 2 to contact area between rod end assembly (67) and piston rod (85) and to keyway. Allow sealant to cure and check that it has bonded to the surfaces.

(g) Install bolt (72), washer (71) and collar (70).

CAUTION: MANIFOLD BORE FOR PISTON MAY BE REWORKED OVERSIZE AND REQUIRE 0.015- OR 0.030-INCH OVERSIZE PISTON AND SEAL ASSY (85, 81, FIG. 1101).

(h) Check that correct parts are being assembled and install seal assembly (81) composed of seals (82, 83) and key (84) on piston (85) (Fig. 505B).

CAUTION: MANIFOLD BORE MAY BE REWORKED OVERSIZE AND REQUIRE MATCHING WITH RESPECTIVE OVERSIZE PISTON AND SEAL ASSY (85, 81, FIG. 1101).

(19) Check that correct parts are being assembled and install piston (85) and preassembled parts in manifold assembly (140). Apply a light coating of grease, Batco 8401, Type 1 or 2 on faying surfaces of flange (66) and manifold assembly (140). Secure flange (66) with washers (65), bolts (64), and tighten bolts to 80-100 lb-in.

(20) Preassemble parts on bearing (93).

(a) Install seal (88) and packing (89) per 20-50-06. If you are using seal (88) S34852-210H5 also follow the instructions in Figure 505E.

(b) Install piston seal ring (92). When using optional packing (92), fill groove within one quarter turn with a continuous spiral of packing. Trim OD of packing such that a force of 10-50 pounds is required to slide bearing into cylinder bore.

(c) Install rings (90) and packing (91).

CAUTION: MAKE SURE THAT SCRAPER (86) IS POSITIONED BETWEEN RETAINER (87) AND END FITTING (56), OR SCRAPER DAMAGE AND MALFUNCTION OF UNIT MAY OCCUR.

(21) Install preassembled parts and bearing (93), retainer (87), and scraper (86) (Fig. 505D).

(22) On 65-44761-8, -9, -14, -17, -20, install packing (57) on end fitting assembly (56). Position end fitting assembly (56) onto manifold assembly (140). Make sure the two drain holes on end fitting assembly (56) are oriented toward filter retainer (45) and filter element (48). Install washers (55), bolts (54), and tighten to 140-200 lb-in.

(23) On 65-44761-10, -12, -15, -16, -18, -19, -21, -22, position end fitting assembly (56A) into manifold assembly (140). Make sure the two drain holes on end fitting assembly (56A) are oriented toward filter retainer (45) and filter element (48). Install washers (55), bolts (54), and tighten bolts to 140-200 lb-in.

(24) On 65-44761-10, as applicable, position cover (52A) on end fitting assembly (56), install screws (51) and tighten to 40-50 lb-in.

(25) On 65-44761-8, -9, -14, -17, -20, install packing (53) on transducer (52). Apply a light coating of grease, Batco 8401, Type 1 or 2 to cavity and faying surfaces of end fitting assembly (56) and slide transducer into place. Install screws (51) and tighten to 40-50 lb-in.

(26) On 65-44761-8, -9, -14, -17, -20, install packing (13) and plate assembly (12) on servo valve assembly (11). Install servo valve assembly, screws (10), and tighten to 40-50 lb-in.

(27) On 65-44761-10, position plate assembly (12) and cover (11A) on manifold (140), install screws (10) and tighten to 40-50 lb-in.

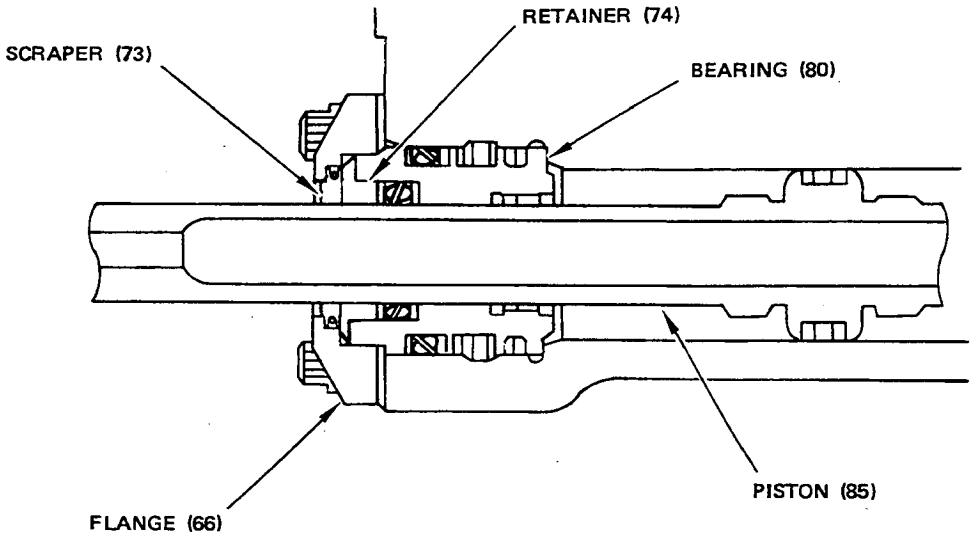
CAUTION: SLIDE (127) AND SLEEVE (128) ARE PRECISION MATCHED SETS AND MUST BE MATED AS SERIALIZED TO OBTAIN PROPER FIT.

(28) Install rings (122), packing (123), rings (124), and packing (125) on sleeve (128), and insert slid (127) in sleeve (128). Instal1 guide (130), spring (129), and insert valve assembly (126) in manifold assembly (140).

(29) Install rings (120) and packing (121) on retainer (119), screw retainer into manifold assembly (140), and tighten to 400-450 lb-in.

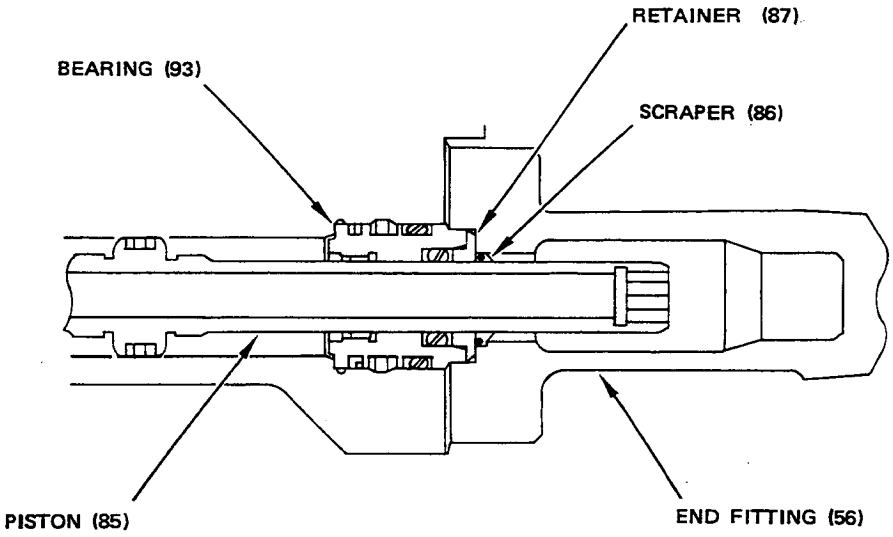
CAUTION: SLIDE (138) AND SLEEVE (139) ARE PRECISION MATCHED SETS AND MUST BE MATED AS SERIALIZED TO OBTAIN PROPER FIT.

(30) On 65-44761-8, -9, -10, -14, -17, -20, install rings (135), packings (136) on sleeve (139), and slide (138) in sleeve (139). Insert valve assembly (137) and spring (134) in manifold assembly (140).



NOTE: ITEM NOS. REFER TO FIG. 1101

Scraper Installation
Figure 505C



NOTE: ITEM NOS. REFER TO FIG. 1101

Scraper Installation
Figure 505D

(31) On 65-44761-8, -9, -10, -14, -17, -20, install rings (132) and packing (133) on retainer (131) and install in manifold assembly (140). Tighten to 225-275 lb-in.

(32) On 65-44761-8, -9, -10, -14, -17, -20, install rings (62) and packing (63) on flow control plug or thermostatic valve (61) and insert in manifold assembly (140). Place rings (59) and packing (60) on retainer (58) and install in manifold assembly (140). Tighten to 250-300 lb-in.

(33) Install rings (49) and packing (50) on filter element (48); rings (46) and packing (47) on retainer (45). Thread retainer on manifold assembly (140) to engage approximately 2 threads and apply a light coating of grease Batco 8401, Type 1 or 2 to exposed threads on retainer. Tighten retainer to 200-225 lb-in.

(34) Install rings (43) and packing (44) on filter element (42) (65-44761-8, -9, -14, -17, -20); rings (40) and packing (41) on retainer (39) and install in manifold assembly (140) (65-44761-8, -9, -10, -14, -17, -20). Tighten retainer to 200-250 lb-in.

(35) Install ring (32) and packing (33) on plug (31) and install in manifold assembly (140). Using Input Cavity Plug Torque Wrench Adapter 65-44761-F16, tighten to 650-680 lb-in.

(36) On 65-44761-8, -9, -14, -17, -20, install packing (9) and plate assembly (8) on valve assembly (7), position valve assembly and secure with screws (6). Tighten to 40-50 lb-in.

(37) On 65-44761-10, position plate assembly (8), cover (7A) on manifold (140) and install screws (6A), tighten to 40-50 lb-in.

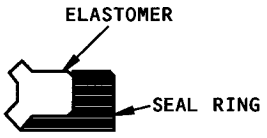
(38) Install spacer (30) on the splined end of shaft assembly (34) and temporarily install a 4-40 screw of suitable length in the end of shaft (6 or 6A or 6B, Fig. 1103).

CAUTION: ENSURE THAT INPUT ARM ASSEMBLY (21) WITH THE PROPER SERIAL NUMBER IS INSTALLED ON THE POWER CONTROL UNIT TO PREVENT POSSIBLE DAMAGE TO VALVE MECHANISM.

(39) Install arm assembly (21) (bearing (28) already installed) with the holes for bolts (20) in alignment with depressions in shaft (2, Fig. 1103).

NOTE: Support shaft assembly (34) by the 4-40 screw while positioning arm assembly (21), to prevent excessive pressure on the servo valve mechanism.

(40) Install bolts (20) and nuts (19) and tighten to 30-40 lb-in.



1. Assemble the two parts of the seal per the cross-sectional view shown above.

2. Install the seal with the elastomer (black material) on the high pressure side of the hydraulic fluid.

Assembly and Installation of S34852-210H5 Seal
Figure 505E

1348112

(41) Using a suitable indicator check that axial play of shaft assembly (34) is 0.0018- to 0.0030 inch at room temperature. If necessary, reposition arm assembly (21) on shaft assembly (34), or remove layers of shim material from spacer (30) to obtain required play.

(42) Remove 4-40 screw from shaft (6 or 6A or 6B, Fig. 1103).

(43) Install plugs (3 and 2) and cap (1).

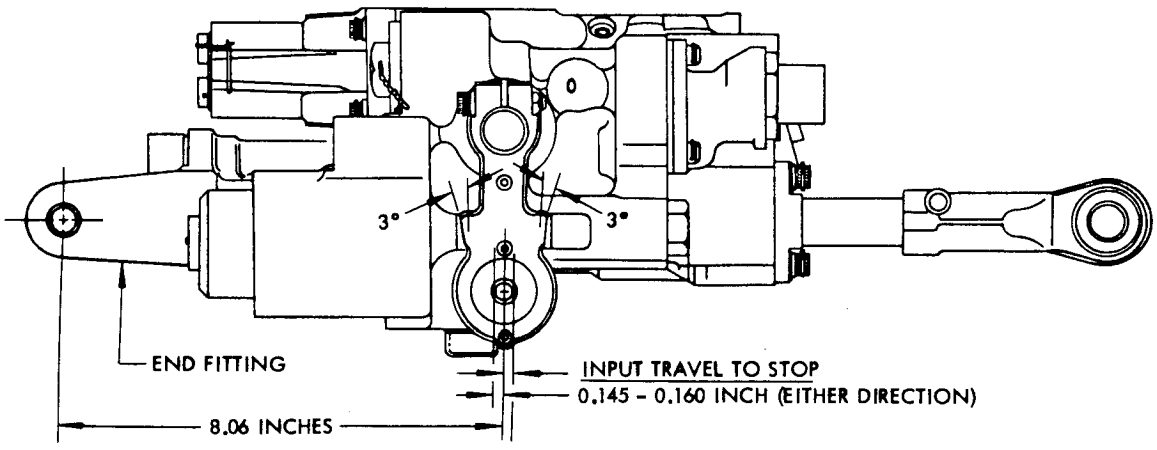
(44) Check travel dimensions of input arm (21) (Fig. 506). If necessary, calibrate arm (21) in accordance with TESTING par. 12.G.(4).

(45) Test unit per TESTING.

(46) After final testing, install lockwire per 20-50-02 (Fig. 507).

(47) After final testing, apply sealant 30-121 to retainers (58, 119, 131, Fig. 1101). Apply sealant in the form of a well rounded fillet (Fig. 601).

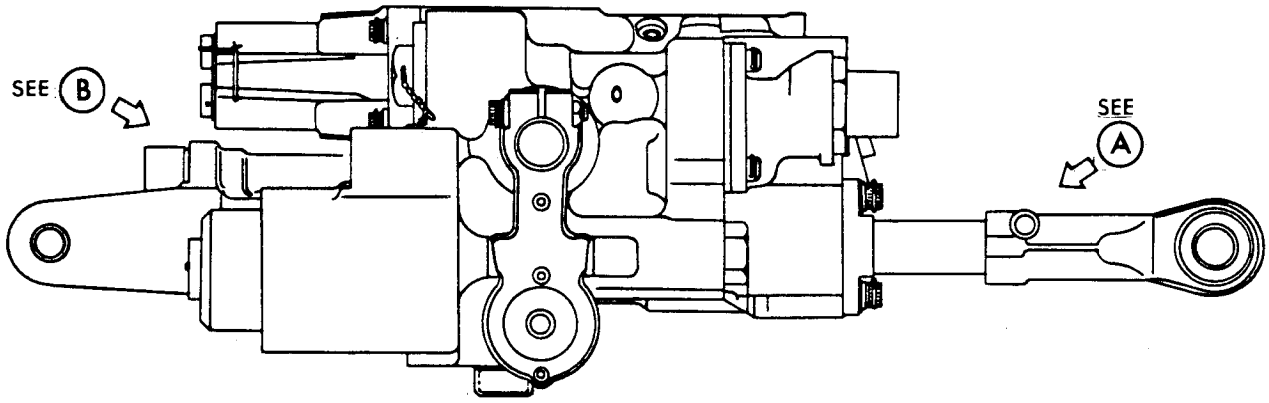
(48) After final testing, apply Silastic RTV 601 to gap between servo valve assembly (18, Fig. 1101) and the manifold assembly as shown in Fig. 601.



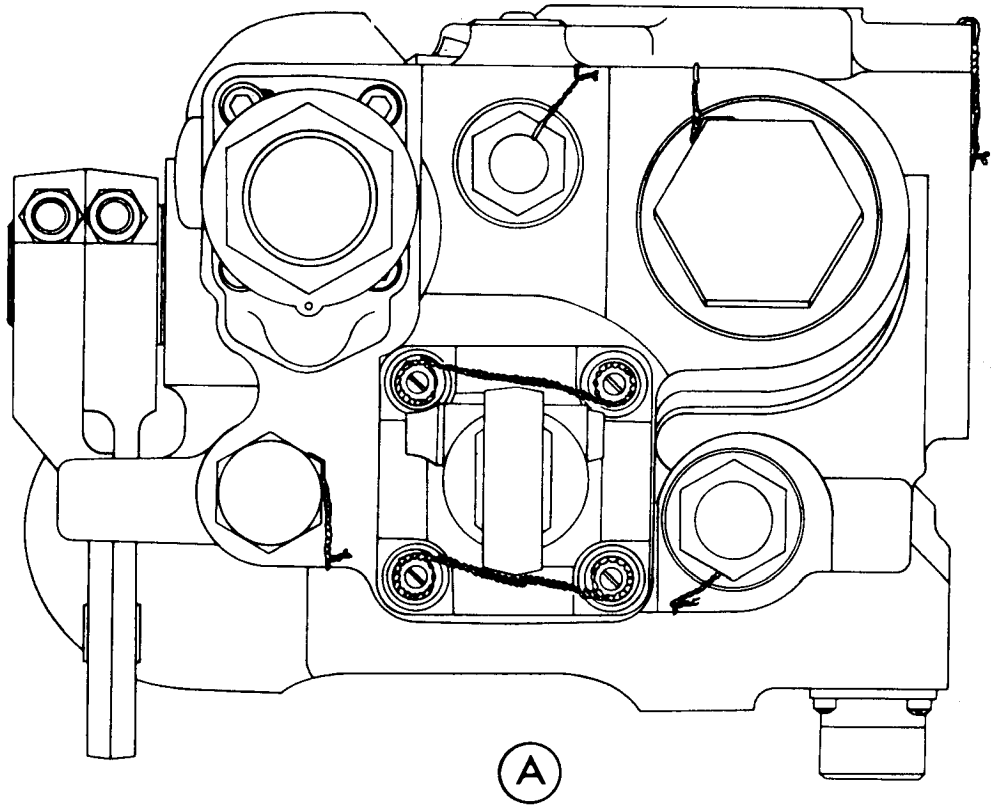
CLEARANCES APPLY TO ALL ASSEMBLIES
(65-44761-8, -9, -14 SHOWN)

Input Arm Clearances
Figure 506

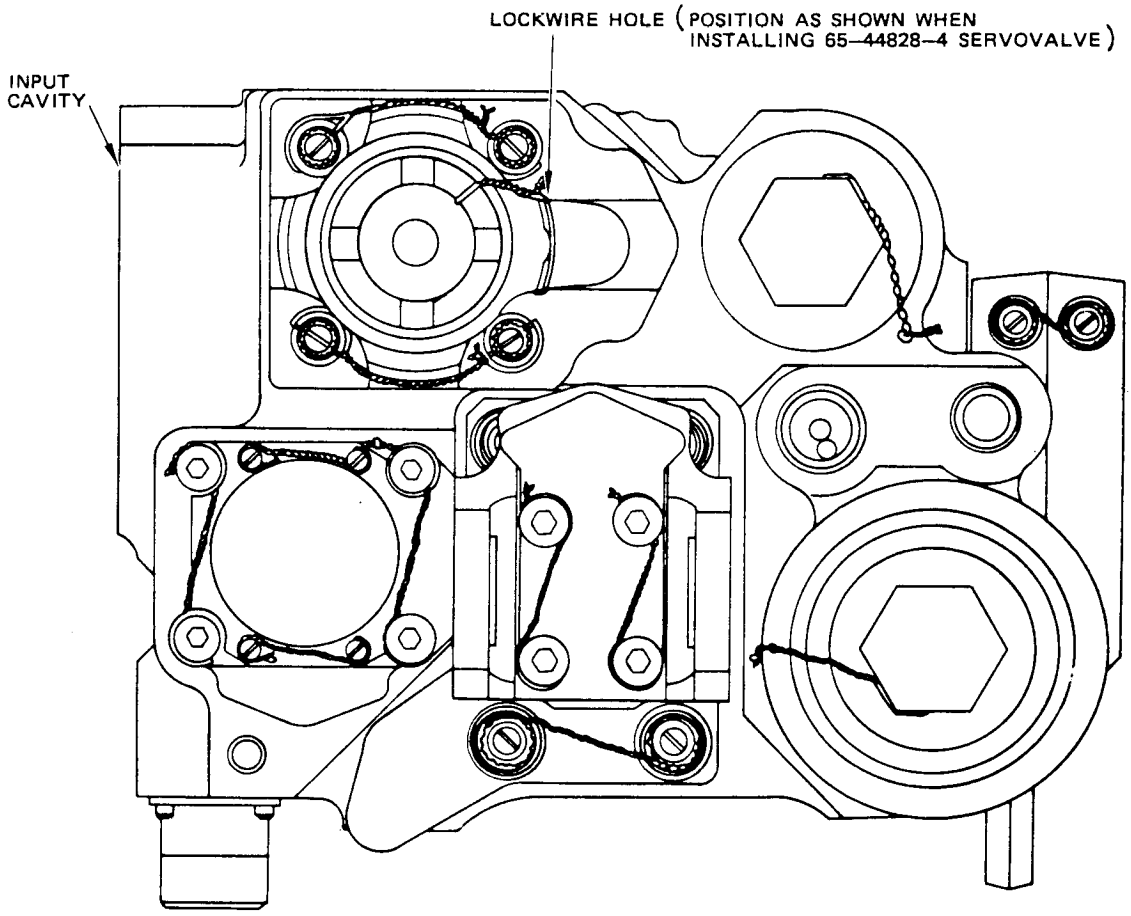
(49) Wipe off excess grease from retainers (45, 94), transducer (52), flange (66), and plug (96). Clean contact areas between retainers, flange, plug and manifold assembly (140) and between transducer and end fitting assembly (56) with MEK. Apply a bead of sealant, BMS 5-26, type 2 to the contact lines. Allow sealant to cure and check that it has bonded to the surfaces (Fig. 601).



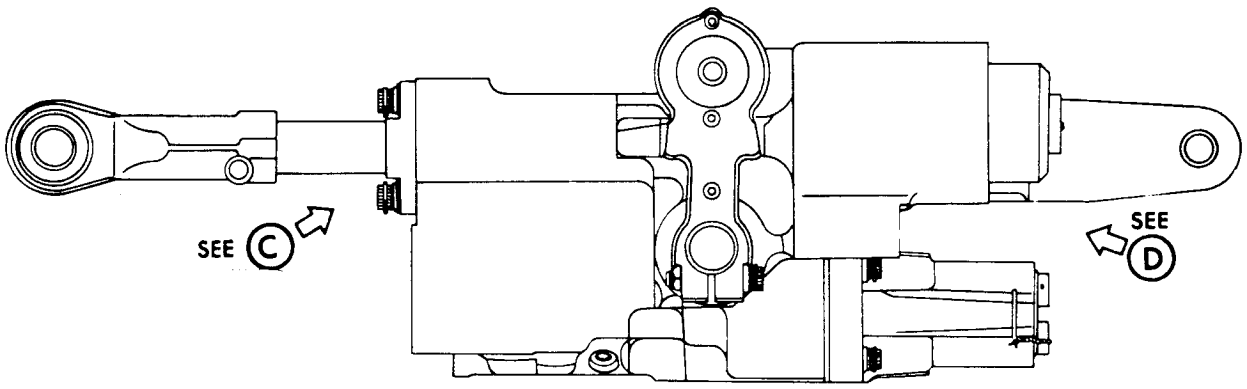
65–44761–8, –9, –10, –14, –17, –20



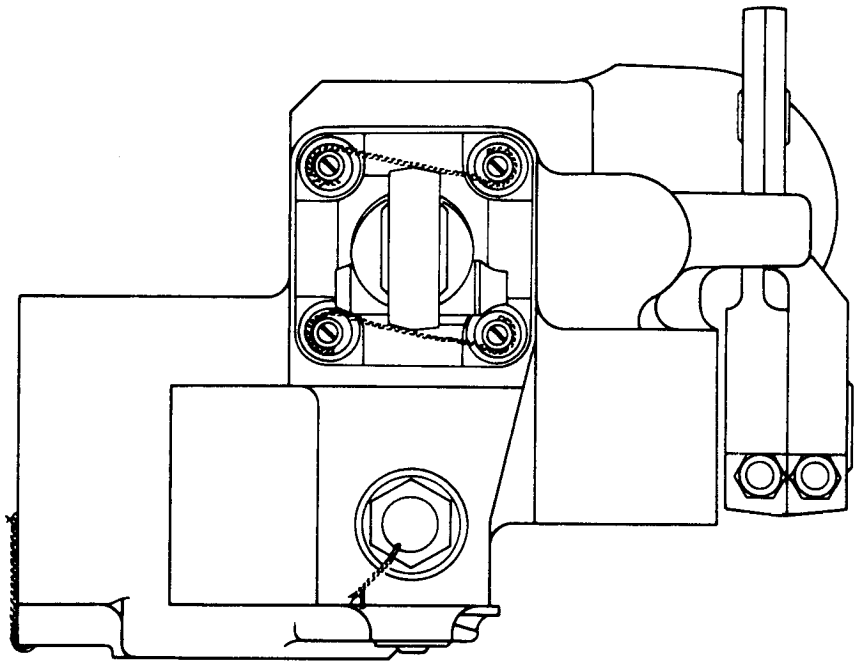
Lockwire Diagram
Figure 507 (Sheet 1)



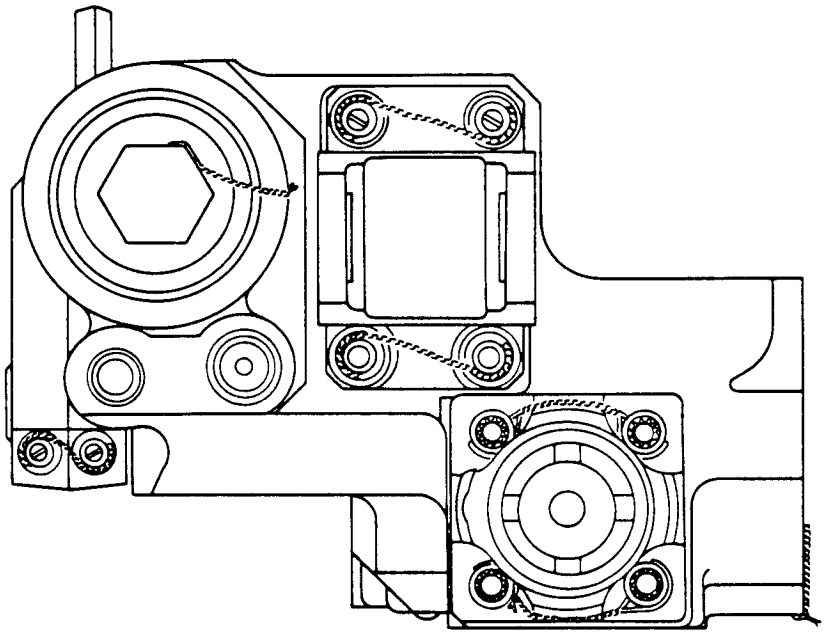
Lockwire Diagram
Figure 507 (Sheet 2)



65–44761–12, –15, –16, –18, –19, –21, –22



Lockwire Diagram
Figure 507 (Sheet 3)



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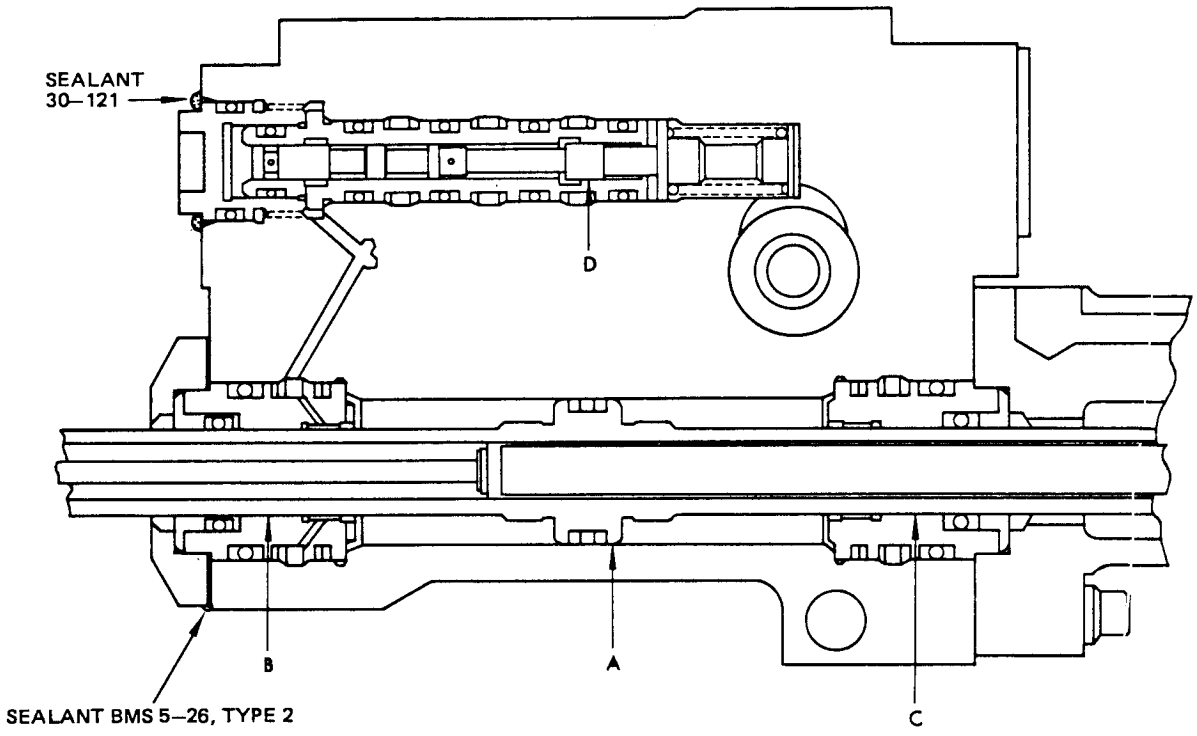
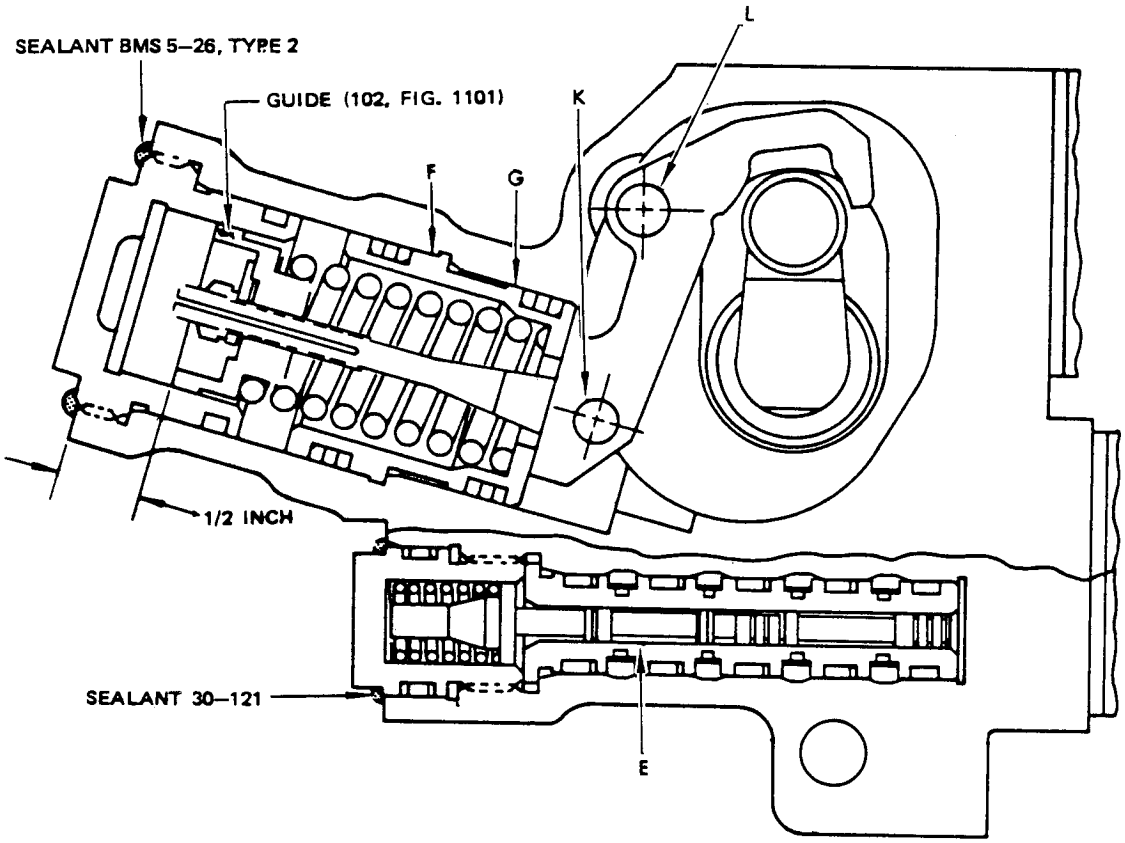
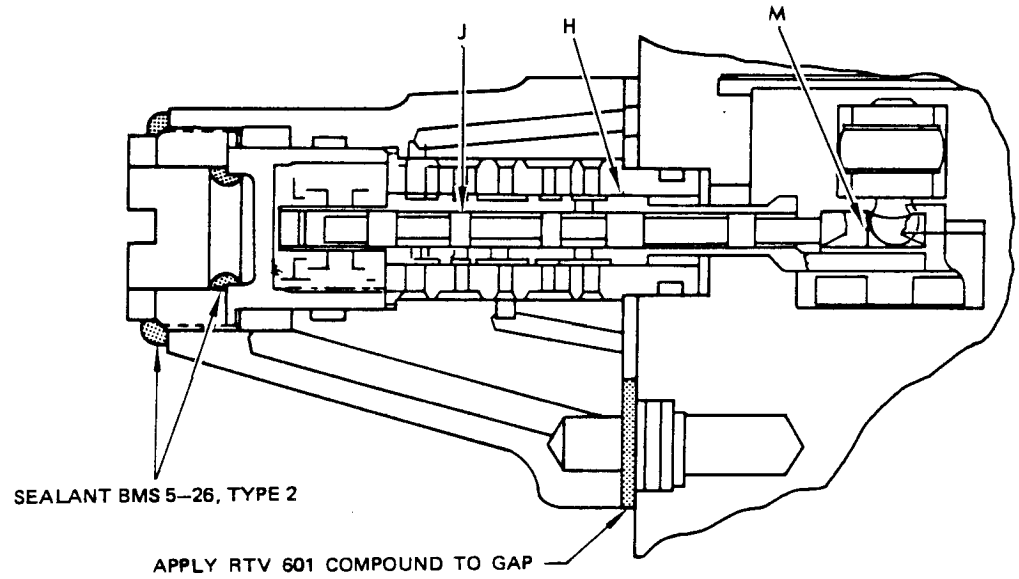
Lockwire Diagram
Figure 507 (Sheet 4)

FITS AND CLEARANCES







Fits and Clearances
Figure 601 (Sheet 2)

		Design Dimensions				Service Wear Limits		
Ref Letter Fig.601	Mating Figure and Index No.	Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inches)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
A	1106-37 ID 1101-85 OD	1.2410 1.2350	1.2420 1.2355	0.0055	0.0070	1.2310	1.2455	0.0100
A *[2]	1106-37 ID 1101-85 OD	1.2560 1.2500	1.2570 1.2505	0.0055	0.0070	1.2460	1.2605	0.0100
A *[3]	1106-37 ID 1101-85 OD	1.2710 1.2650	1.2720 1.2655	0.0055	0.0070	1.2610	1.2755	0.0100
B	1101-80 ID 1101-85 OD	0.74945 0.7478	0.74995 0.7483	0.00115	0.00215	0.7463	0.7514	0.0031
C	1101-93 ID 1101-85 OD	0.74945 0.7478	0.74995 0.7483	0.00115	0.00215	0.7463	0.7514	0.0031
D	1101-128 ID *[4] 1101-127 OD			0.000075	0.000125			0.000150
E	1101-139 ID *[4] *[5] 1101-138 OD			0.000075	0.000125			0.000150
F	1106-37 ID *[6] 1101-112 OD	1.741 1.737	1.743 1.738	0.003	0.006	1.731	1.748	0.010
G	1106-37 ID *[6] 1101-112 OD	1.616 1.612	1.618 1.613	0.003	0.006	1.606	1.623	0.010
H	1102-14 ID *[4] 1102-12 OD			0.000075	0.000125			*[1]

Ref Letter Fig. 601	Mating Fig. and Index No.	Design Dimensions				Service Wear Limits		
		Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inches)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
J	1102-12 ID *[4] 1102-11 OD			0.000075	0.000125			*[1]
K	1101-118 ID *[6] 1101-116 OD	0.2512 0.2506	0.2517 0.2510	0.0002	0.0011	0.2463	0.2560	0.005
L	1101-118 ID *[6] 1101-99 OD	0.3125 0.3122	0.3128 0.3124	0.0001	0.0006	0.3110	0.3139	0.0015
M	1102-11 ID 1103-4 OD	0.3114 0.3110	0.3115 0.3112	0.00015	0.00050	0.31070	0.31160	0.00090

*[1] Maximum allowable clearance determined by internal leakage of power control unit assembly. When functionally tested in accordance with TESTING, par 13.E., flow limit is 3000 cc per minute for allowable service limits.

*[2] Unit with 0.015-inch oversize piston and bore.

*[3] Unit with 0.030-inch oversize piston and bore.

*[4] Lapped parts.

*[5] 65-44761-8, -9, -10, -14, -17, -20

*[6] 65-44761-8, -9, -14, -17, -20

Fits and Clearances
Figure 601 (Sheet 4)

TESTING

NOTE: Procedures apply to all assemblies except otherwise noted.

1. Test Equipment

   NOTE: Refer to SPECIAL TOOLS, FIXTURES, AND EQUIPMENT for listing of detailed items required for testing.

   A. Hydraulic test stand capable of supplying controlled hydraulic fluid flow of 2 gpm to 3000 psi; static capacity 5400 psi and fluid temperature of 70-110°F.

   B. Filter (in-line type) with filtering capability of 10 microns nominal; 25 microns absolute.

   C. (For 65-44761-8, -9, -14, -17, -20) Electrical power supply capable of:

      (1) 28 volts dc for solenoid valve

      (2) 26 volts, 400-Hz, single-phase ac for linear position transducers

      (3) 8 volts dc for electrohydraulic (transfer) valve

      (4) In the following tests the electrohydraulic servo valve (11) coils, except where noted otherwise, must be connected in series as follows:

         (a) Tie pins 6 and 7 together.

         (b) To extend unit, apply 8 volts dc across pins 5 and 8, with pin 5 being positive.

         (c) To retract unit, apply 8 volts dc across pins 8 and 5, with pin 8 being positive.

   D. (For 65-44761-8, -9, -14, -17, -20) Electrical equipment capable of the following:

      (1) Applying up to 1500 volts ac for dielectric checks

      (2) Applying up to 500 volts dc for resistance checks

      (3) Measuring resistance in ohms and megohms

      (4) Measuring force up to 125 pounds (Transducer)

      (5) Oscilloscope and vacuum tube voltmeter

E. Flowmeters (or other suitable means) to measure leakage to 5000 cc per minute and flow to 2 gpm.

F. Mechanical measuring equipment; dial indicators, vernier micrometer.

G. Timing devices for minutes and seconds to measure durations and compute rates.

2. Preparation for Test

A. Unless otherwise specified, testing shall be performed in an ambient temperature of 60-100°F, using hydraulic fluid, BMS 3-11 at temperature of 70-110°F.

B. The following hydraulic pressures shall be used during testing unless otherwise stated:

(1) System Supply Pressure -- 2975-3025 psi

(2) System Return Pressure -- 40-50 psi

(3) System Supply Proof Pressure -- 5375-5425 psi

(4) System Return Proof Pressure -- 2975-3025 psi

C. Apply hydraulic fluid , BMS 3-11, or Skydrol Assembly Lube MCS 352 to O-ring packings (2, 4) and threads of unions (1, 3) and install per Fig. 1107.

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

3. Pretesting

NOTE: Refer to par. 11, 12 for functional testing of assembled power control unit.

A. Perform listed pretests on the following assemblies and components prior to installation (Fig. 1101).

(1) Manifold assembly (140) -- Pretest in accordance with par. 11.

(2) End fitting assembly (56) -- Pretest in accordance with par. 4.

(3) Hydraulic solenoid valve assembly (7) per the manufacturer's overhaul manual.

(4) Electrohydraulic servo valve (11) -- Refer to manufacturer's overhaul manual for details of functional testing. Use gasket plate (12, Fig. 1101), or equivalent to mount valve on suitable test fixture.

(5) Bypass valve assembly (126) -- Pretest in accordance with par. 6.

(6) Shutoff valve assembly (137) -- Pretest in accordance with par. 7.

(7) Thermostatic Control Valve Assembly (61) -- Pretest in accordance with par. 8.

(8) Linear Transducer Assembly (52) -- Pretest in accordance with par. 9.

(9) Servo Valve Assembly (18) -- Pretest in accordance with par. 10.

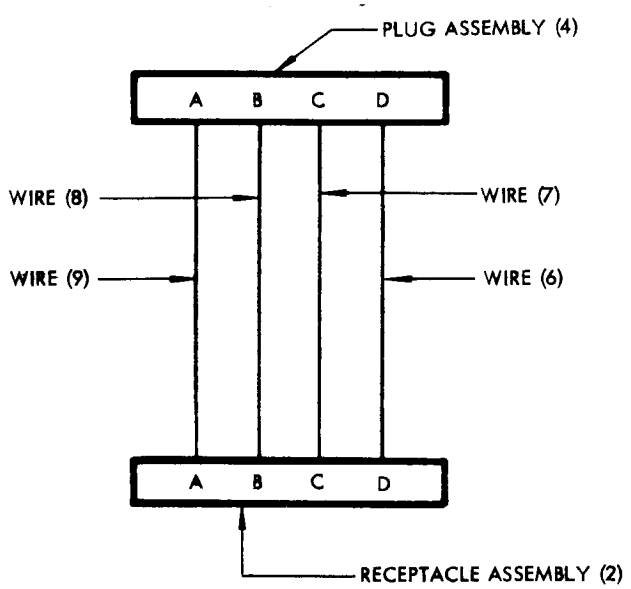
4. End Fitting Assembly (69-35660-1) Pretest (Fig. 1104)

A. Use Multimeter, Model 260, or equivalent, to check continuity of wiring in accordance with wiring diagram (Fig. 701).

B. Using Hypot, Model 404, or equivalent, slowly apply 1500 volts ac for 1 minute from pins A, B, C and D to body, and from pins A and B to pins C and D. There shall be no evidence of arcing or insulation failure.

C. Using Megger Test Set 412A, or equivalent, apply 500 volts dc and measure insulation resistance pins A, B, C and D body, and between A and B and pins C and D. The resistance must be 100 megohms or more.

5. Deleted.



NOTE: PART ITEM NUMBERS REFER TO FIGURE 1104

End Fitting Assembly Wiring Diagram
Figure 701

6. Bypass Valve Assembly Pretest (Fig. 1101). See Fig. 703 for testing setup.

   A. Install bypass valve (126) with spring guide (130) and spring (129) into test fixture 65-44761-F3 or TF 66-22801, or equivalent, as shown on Fig. 703.

   B. Perform Pressure Actuation Test

      (1) Open cylinder and return ports. Gradually apply fluid to pressure IN port until 25-cc per minute flow can be measured from the pressure OUT port.

(2) Record actual pressure at which flow is measured. Check that recorded pressure is 500 to 680 psi.

(3) Increase fluid pressure to 800 psi. Gradually lower pressure until 25 cc per minute flow is maintained. At this flow, pressure must be within 50 psi of pressure recorded in step (2).

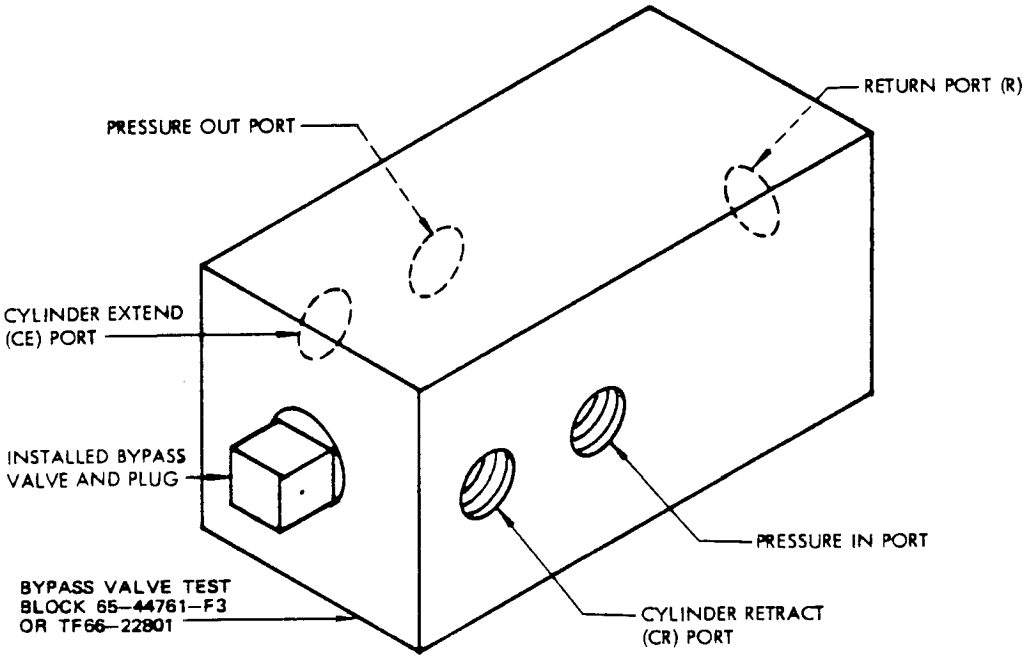
C. Perform Internal Leakage Tests

(1) Open the cylinder retract port CR, cylinder extend port CE, and close the pressure OUT port. Apply 3000 psi to pressure IN port. Measured leakage from each open port (CR, CE, and R) must not exceed 10 cc per minute.

(2) Open return port R and close pressure OUT port. Apply 3000 psi to pressure IN port and either cylinder ports CR or CE. Measured leakage from the cylinder port left open must not exceed 10 cc per minute.

D. Perform Pressure Drop Test

(1) Open pressure IN and OUT ports and return port R. Apply a pressure drop of 530 psi across port CR to CE. Check that measured flow through the valve is 2.0 to 2.4 gallons per minute.



Bypass Valve Test Setup
Figure 703

7. Shutoff Valve Pretest (See Fig. 704 for test setup.)

NOTE: Refer to par. 13 for testing to determine extent of overhaul required.

A. Perform Pressure Actuation Test

(1) Install shutoff valve (137, Fig. 1101) with spring (134) and retainer (131) into test fixture TF 69-35662 or 65-44761-F4.

(2) Open all ports except P and CR. Apply 10-psi fluid pressure at port CR and gradually apply pressure to port P.

(3) Check that applied pressure at port P is 400-600 psi when flow from port ACR is first noticed.

B. Perform Internal Leakage Test

(1) Open ports P, R and CR and close port CE.

(2) Apply 3000-psi fluid pressure to ports ACR and ACE and check that leakage does not exceed 10 cc per minute at each port.

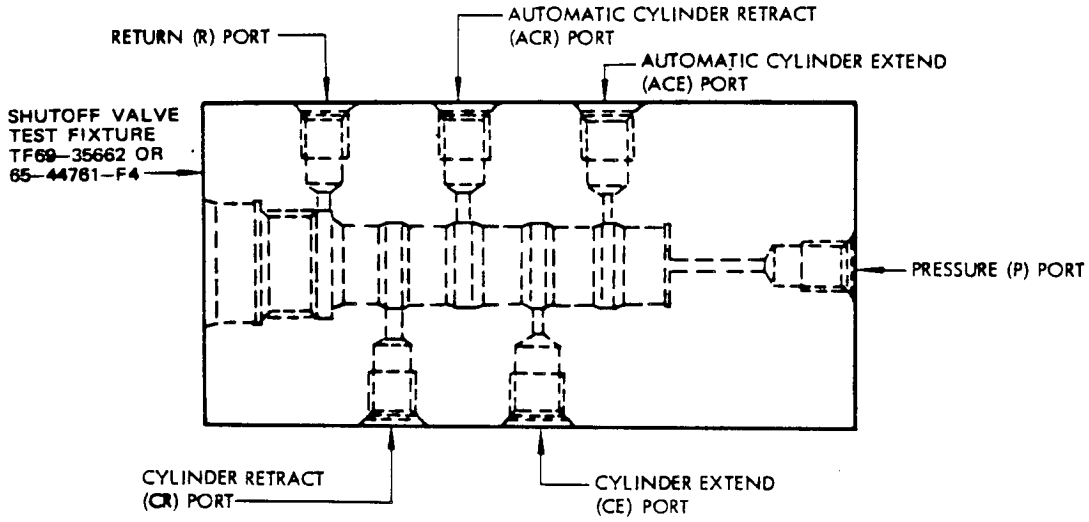
C. Perform Metered Flow Tests

(1) Open ports CE, ACR, ACE, P and R, and hold slide in de-energized position (slide fully inserted in sleeve). Apply 1500-psi fluid pressure to port CR.

(2) Check that flow from port CE is 525 - 625 cc per minute, and that leakage is maximum of 10 cc per minute from port ACR and 5 cc per minute from port ACE.

(3) Open ports CR, ACR, ACE, P and R. Apply 1500-psi fluid pressure hydraulic pressure to port CE.

(4) Check that flow from port CR is 525 - 625 cc per minute, and that leakage is maximum of 10 cc per minute from port ACR and 5 cc per minute from port ACE.



Shutoff Valve Test Setup
Figure 704

8. Thermostatic Control Valve Assembly Pretest (See figure 705 for testing setup.)

NOTE: Use hydraulic fluid conforming to BMS 3-11 filtered to 10 microns as test fluid.

A. Test Preparation

(1) Install thermostatic valve assembly (61, figure 1101) in Test Manifold Assembly, TF59830-1001, and connect manifold assembly to test equipment as shown.

B. Perform 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 fluid pressure to return port for one minute, then remove pressure.

(5) Examine thermostat valves for damage.

C. Perform 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 fluid pressure to 3000 psi measured at inlet port.

(3) Stabilize temperature of test unit at -15°F to -25°F, as indicated by potentiometer. Valve (61) 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 gallons per minute.

D. Perform Operation to Closed Position, and Leadage 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. Thermostatic control valve must be closed, as evidenced by no flow from valve E other than leakage.

(4) Close valve D, and wait for two minutes.

(5) Measured leakage from valve E must not exceed 50 cc per minute.

E. If necessary to adjust operating range of valve (61), proceed as follows:

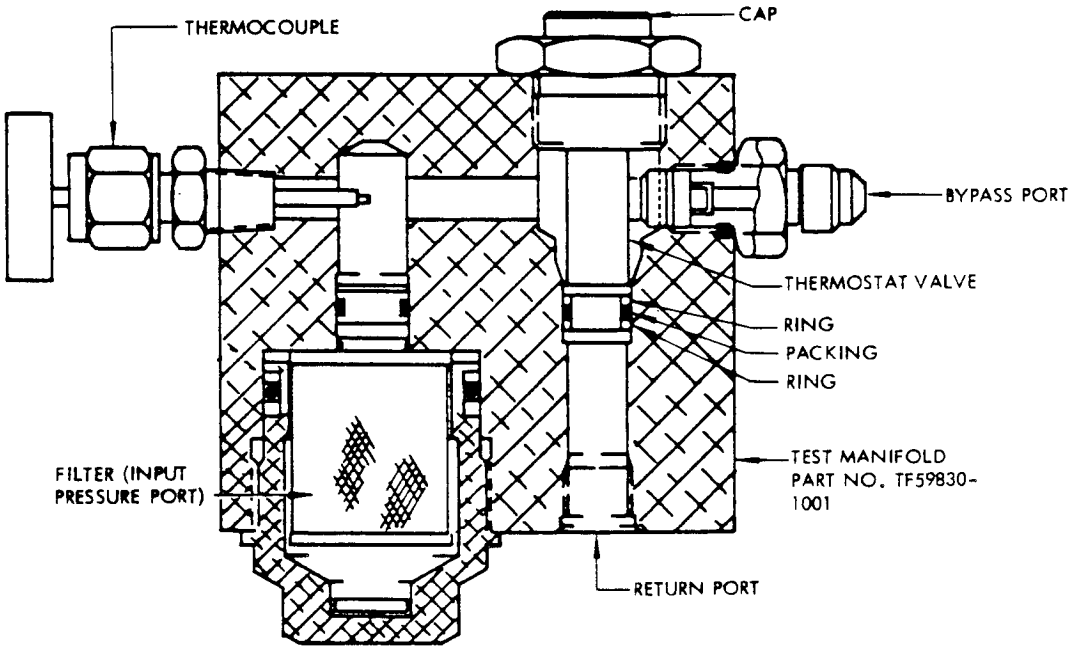
(1) Depress actuator until it touches lower part of idler spring, forcing idler spring against orifice tip with light pressure, as shown in figure 705.

(2) Measure clearance between idler spring tip and actuator with wire feeler gauges. Clearance should be 0.002 inch.

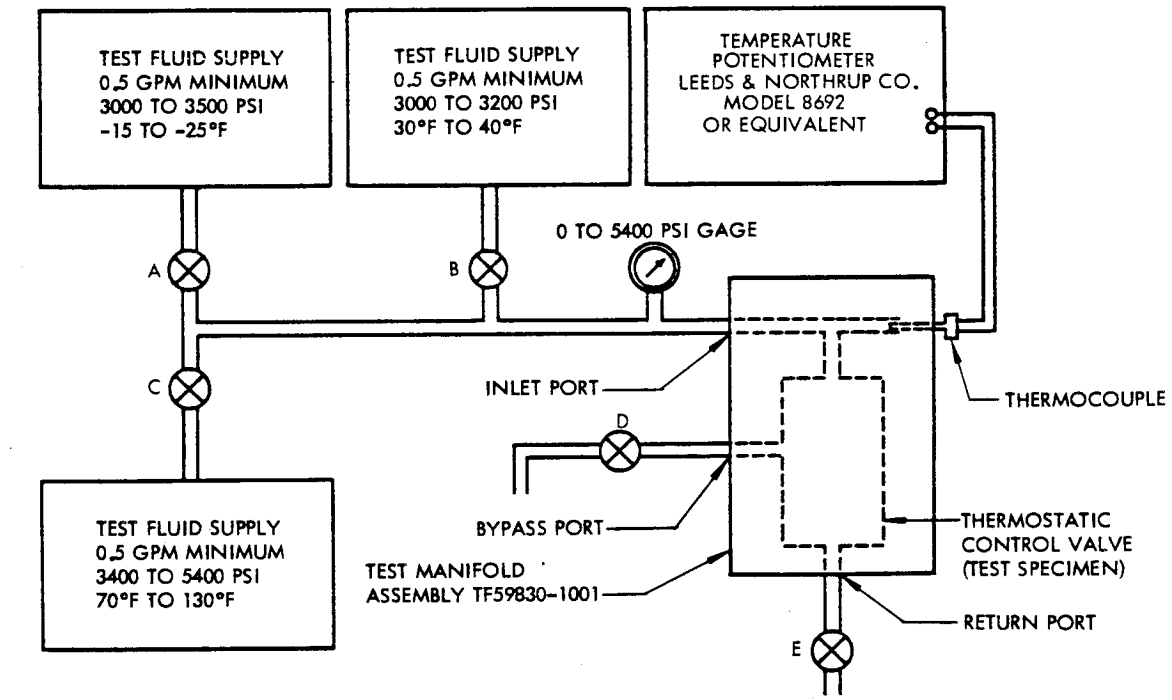
(3) To raise operating temperature range, decrease clearance by bending tip of idler spring. To lower operating temperature range, increase clearance by bending tip of idler spring.

NOTE: A change in clearance of 0.0016 inch will cause a change in operating temperature of approximately 10°F.

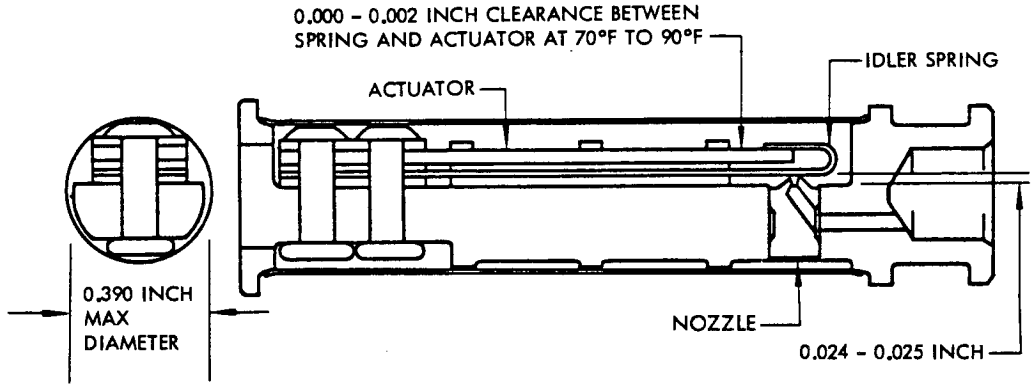
F. Visually examine thermostatic control valve assembly. There must be no damage from any of the previous tests.



Thermostatic Control Valve Test
Figure 705 (Sheet 1)



NOTE: 3/8 INCH OD TUBING
KEEP TUBING AS SHORT AS POSSIBLE



ADJUSTMENT OF CLEARANCE

9. Linear Transducer Assembly Pretest (See figure 1101.)

A. Using Multimeter Model 260 or equivalent, check for continuity between pins A and B and between pins C and D of the electrical connector.

B. Using Hypot Model 404 or equivalent, apply 1000 volts rms ac, slowly between each pin and case. Hold for one minute. There must be no insulation failure or breakdown. Disregard leakage light on Hypot.

C. Use Megger Test Set Model 412A or equivalent, apply 500 volts dc and measure resistance between each receptacle pin and the case. The resistance must be 100 megohms or more.

D. Perform Operational Tests

(1) Install linear position transducer (52) in a suitable test fixture and connect to test setup. (See figure 706.)

(2) Apply power to the test equipment and allow 30 minutes warm up time.

(3) Adjust excitation voltage frequency at 380 to 420 Hz.

(4) Adjust excitation voltage at 25 to 27 volts rms ac.

(5) Adjust transducer probe to best obtainable null position (minimum voltage) by adjusting the micrometer head of test fixture. The null position must fall within the limits shown. (See figure 706.)

(6) At null position, connect Vacuum Tube Voltmeter Model 400D or equivalent across the SIGNAL terminals of the null indicator. The vacuum tube voltmeter indication must not exceed 50 millivolts.

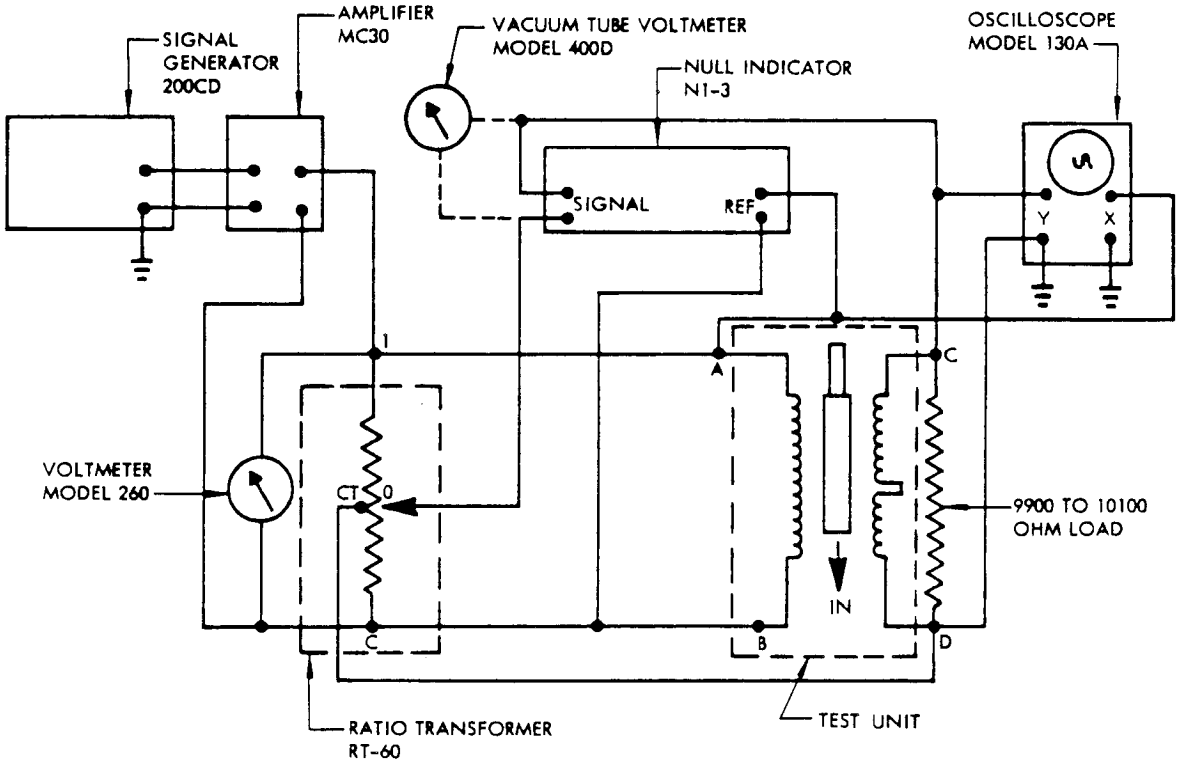
(7) Displace probe to plus 1.750 inches from null, and using Oscilloscope Model 130A or equivalent, measure phase shift. The phase shift must not exceed 10 degrees.

(8) Displace probe to minus 1.750 inches from null, and using Oscilloscope Model 130A, measure phase shift. The phase shift must not exceed 10 degrees.

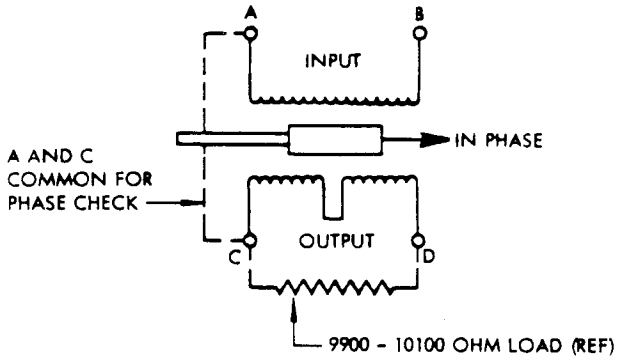
(9) Test for polarity with pins A and C connected as shown. As probe is pushed deeper into the case from null, the output and input shall be in phase (oscilloscope pattern up and to the right).

(10) Measure output voltage for probe displacements shown. (See figure 706.)

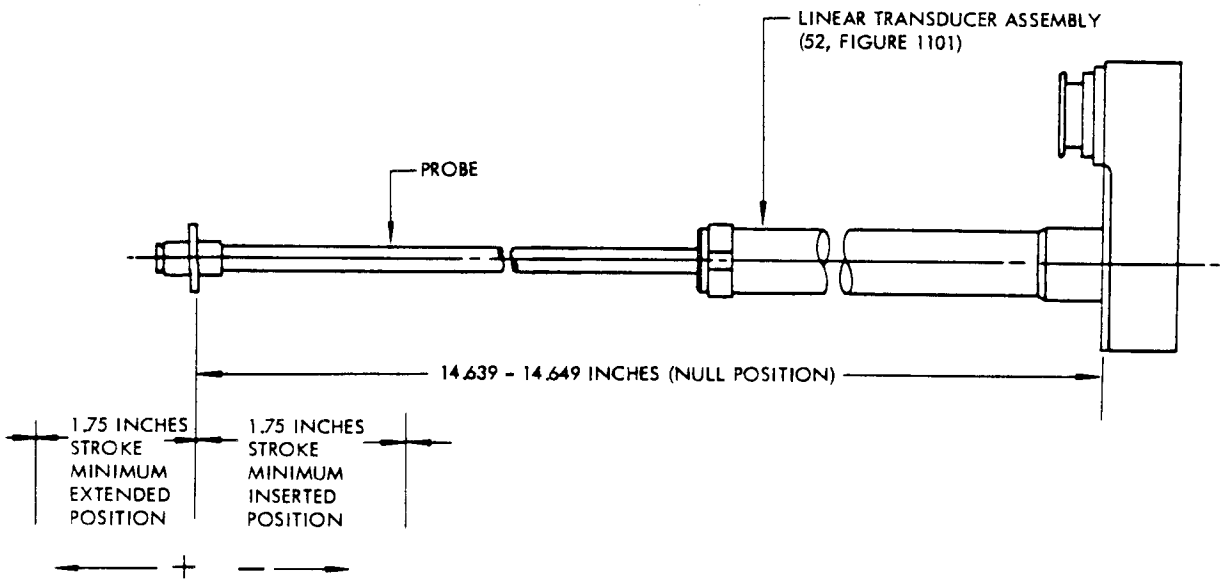
Voltage Gain Data			
Probe Displacement (from null) Inches		Output Voltage	
		Minimum	Maximum
(-)	(+)		
-1.750	+1.750	19.451	21.499
-0.875	+0.875	9.726	10.749
-0.438	+0.438	4.863	5.375
-0.219	+0.219	2.431	2.687
Null	Null	-	0.050



Transducer Assembly Test Details
Figure 706 (Sheet 1)



POLARITY TEST SCHEMATIC



NULL POSITION AND STROKE DIMENSIONS

10. Servo Valve Assembly (18, Fig. 1101) Pretest (See Fig. 707 for test setup.)

NOTE: Refer to par. 13 for testing to determine extent of overhaul required.

A. General

(1) Connect the test valve to TF65-44828 or 65-44671-G2 as shown. Use appropriate O-ring packings to seal fluid ports in the test valve.

NOTE: Pressure proof tests are normally performed before the valve is trimmed.

(2) Use an X-Y Recorder Model 2DR-4 or equivalent with ± 1-degree accuracy and capable of accepting "B" size test paper. Use a suitable spring scale capable of measuring forces up to 11 pounds with ± 5% accuracy.

(3) Make necessary line and gauge connections as required.

B. Perform Proof Pressure Test

(1) During the following tests, there shall be no evidence of permanent deformation, external leakage (other than lap seal leakage of 100 cc/min maximum around the slides), binding or malfuntion of the valve assembly.

(2) Install servo valve on TF 65-44828 or 65-44671-G2 and apply 3000-psi fluid pressure to port R. Hold pressure for 2 minutes and check for leakage.

(3) Deleted.

(4) Cycle valve at 500 psi to remove all air.

(5) With valve at neutral, apply 5400-psi fluid pressure to pressure port P with cylinder ports C1 and C2 blocked and return port R open. Hold for 2 minutes.

(6) Repeat step (5) with 3000-psi fluid pressure and return port R blocked.

(7) Repeat steps (5) and (6) at 1-5-psi fluid pressure.

C. Check Null Adjustment and Measurement

(1) Deleted.

(2) Apply 3000 psi fluid pressure to port P with pressure gages installed in cylinder ports and return port R open to atmosphere.

(3) Displace primary slide and adjust until both gages read identically (C1 pressure equals C2).

(4) Check that the dimension from the centerline of the primary slide drive hole to the mounting face of the servo valve housing is 1.9745 to 1.9755 inches.

(5) Check that reading of cylinder pressures is 1000 to 2000 psi and record as Neutral Pressure.

D. Perform either the Manual or the Automated Cylinder Flow Pressure Check as shown below:

(1) Manual Method

(a) Connect the cylinder ports with a pressure transducer mounted in the interconnect line.

(b) Apply 3000 psi fluid pressure to port P.

(c) Displace valve plus and minus 0.051 inch record the cylinder interconnect pressure on the X-Y plotter for full range of valve travel.

(d) Interconnect pressure must be 1000 to 2000 psi throughout entire stroke as shown on Fig. 712. Pressure must not vary more than plus or minus 300 psi from the neutral pressure recorded in step C.(5) of previous test. Record as Flow Pressure.

(2) Automated Method

(a) Adjust Valve Flow Analyzer, Model 221.

1) Turn Servo - OFF

2) Program - Manual 1

3) Manually adjust valve to hydraulic neutral by observing X & Y of recorder.

4) Open ports C1 and C2 on fixture.

5) Inch/Inch - 0.02

(b) Set Pressure Control Unit, Model 806.

1) Pressure Measurement - P2

2) Adjust recorder X axis to zero.

(c) Adjust Valve Flow Analyer, Model 221.

1) Amplitude - 0.0350

2) Turn Servo - ON

3) Program - AUTO 2

(d) Push start button. Panel will run unit through entire curve. This completes interconnect pressure plot.

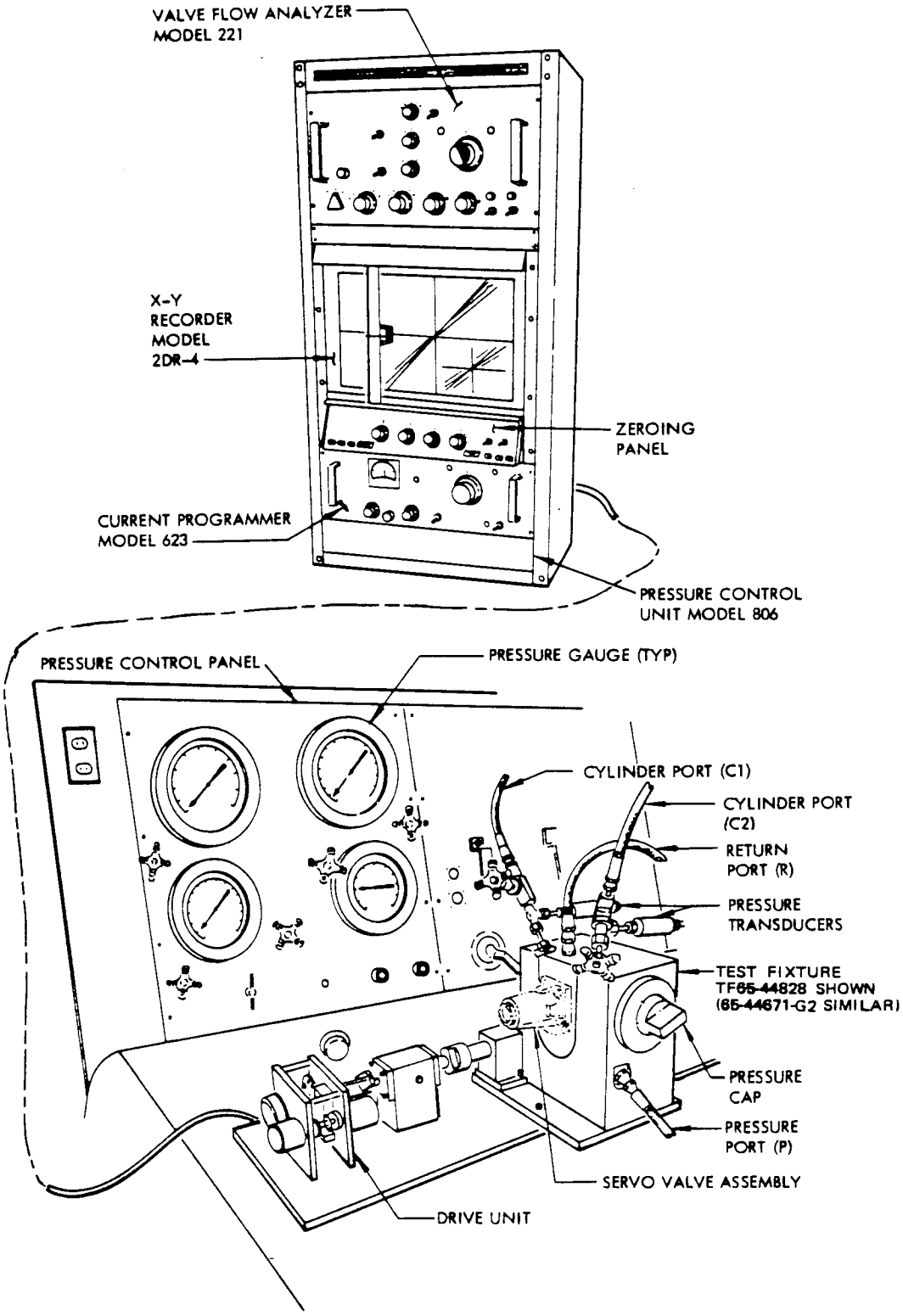
CAUTION: IF RECORDER FLOW SUDDENLY DROPS TO ZERO, MANUALLY MOVE VALVE TO OPPOSITE END AND HOLD UNTIL FIXTURE PISTON MOVES TO OPPOSITE END AND THEN RECOMMENCE CYCLING.

(e) Check that completed interconnect pressure plot is within limits shown on Fig. 712.

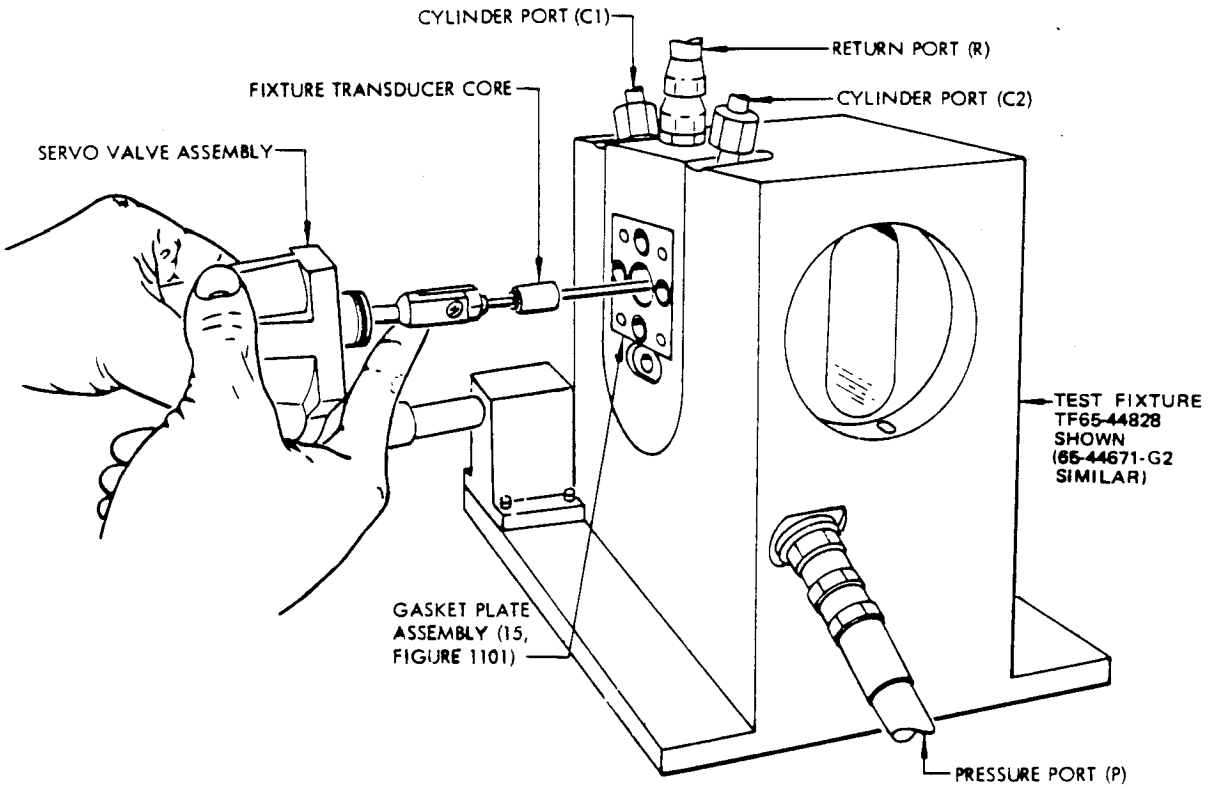
E. Perform Flow Gain Curve Measurement Test

(1) Install fixture transducer core on valve primary plunger as shown on Fig. 708.

(2) Mount valve on test fixture as shown on Fig. 707 and tighten screws snugly.



Servo Valve Functional Test Setup
Figure 707



Installing Fixture Transducer Core on Primary Slide Servo Valve Test
Figure 708

(3) Install ball drive pin and rig pin as shown on figure 709. Leave large cover off.

CAUTION: DO NOT APPLY HYDRAULIC PRESSURE UNTIL RIG PIN IS REMOVED.

(4) Mount paper on X-Y plotter. Use valve flow analyzer and pressure recorder apparatus similar to that shown on figure 707.

(5) Check displacement zero position on plotter vs rig neutral on valve test fixture.

(6) Set Valve Flow Analyzer, Model 221

(a) X axis to D, Y axis to Q

(b) Pen - Auto

(c) Drive Selector - Displacement

(d) Recorder - Zero

(e) Cyl Mod 514 - Dn

(f) Program - Manual 1

(g) GPM/Inch - 0.2

(h) Inches/Inch - 0.01

(i) Amplitude - Set to 0.0400

(j) Null Ref - Set to 0.0535

(k) Servo - OFF

(l) Power - ON

NOTE: Amplitude and null reference settings may change slightly. These settings are for Model 221 Valve Flow Analyzer, Industrial Measurements Corp., Pomona, California.

(7) Set Zeroing Panel (below recorder)

(a) X & Y Range - 10

(b) Servo Pen - ON

(c) Power - ON

(8) Current Programmer, Model 623 (not used for this test).

(9) Set Pressure Control Unit, Model 806

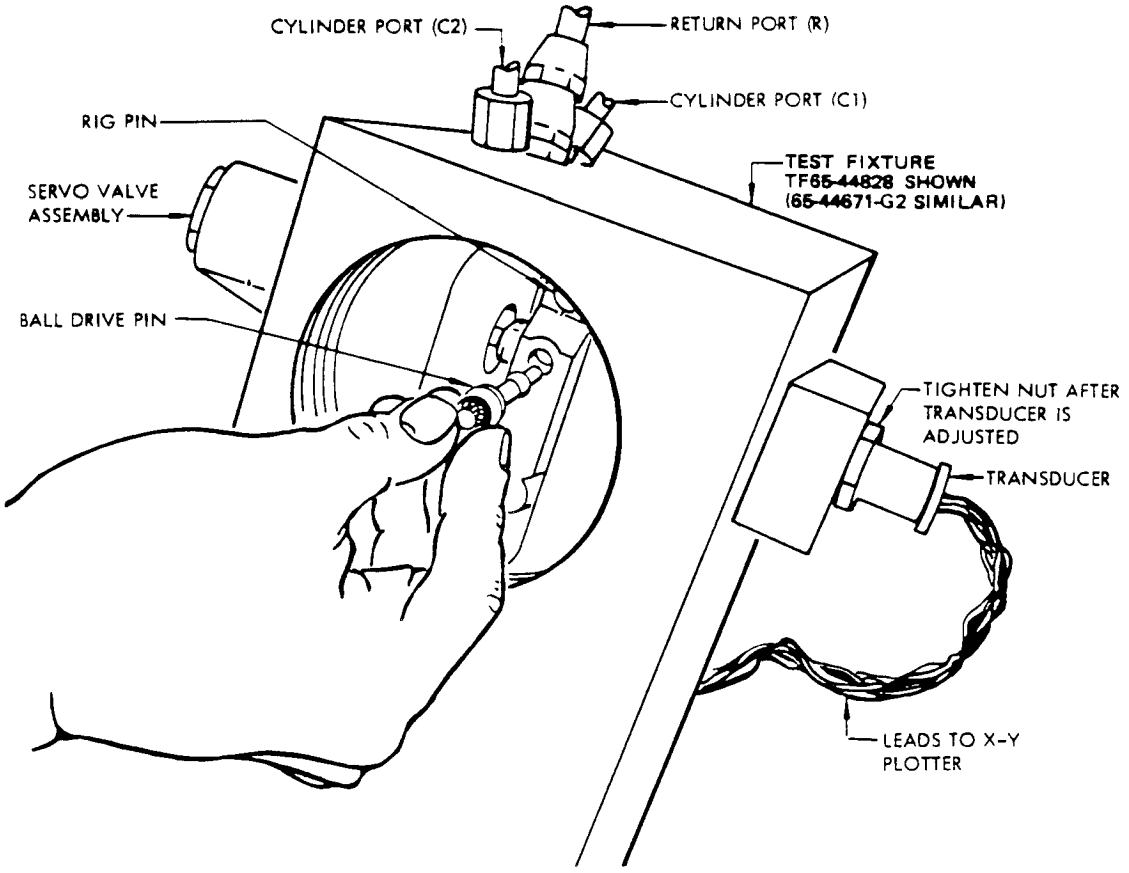
(a) Power ON only

NOTE: Maintain settings unless otherwise stated.

(10) Adjust recorder X & Y to zero by adjusting X & Y zero on zeroing panel. Observe X axis movement on scale. If it moves more than 0.005 inch adjust transducer in test block.

(11) Remove rig pin. Install hydraulic port cover securely in place. (See figure 709.)

CAUTION: APPLICATION OF HYDRAULIC PRESSURE WITH RIG PIN IN PLACE WILL DAMAGE UNIT.



Installing Ball Drive and Rig Pins
Figure 709

(12) Apply 3000 psi fluid pressure at port P on test fixture.

(13) Find hydraulic null of servo valve by manually moving drive mechanism and observing Y axis of needle on X-Y recorder.

(14) With valve and recorder at zero on Y axis, adjust X axis to zero. Make sure pen drops on zero.

(15) Adjust Valve Flow Analyzer, Model 221.

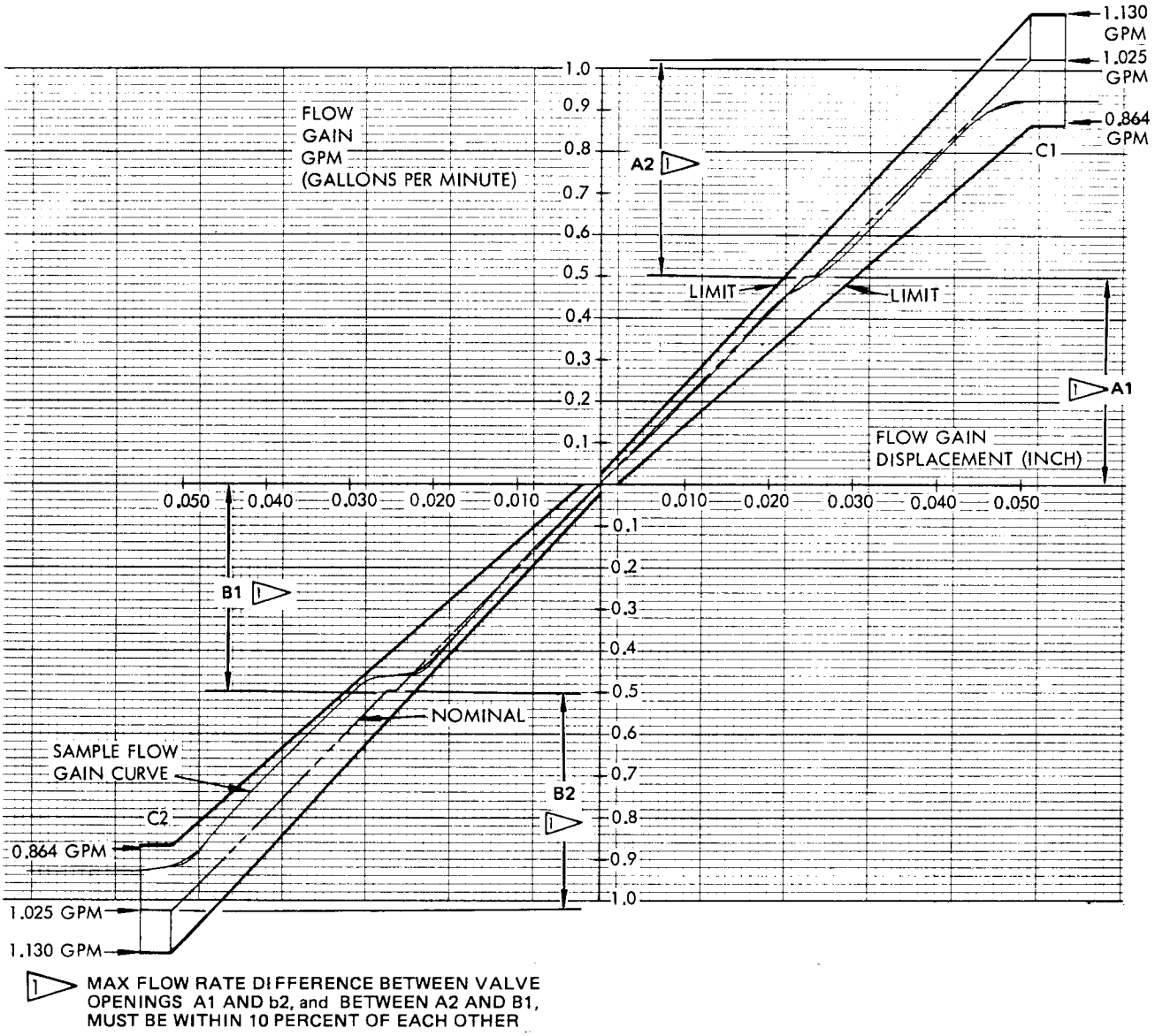
(a) Turn servo - ON

(b) Adjust Null Ref to obtain zero flow.

(c) Program to AUTO 1

(16) Push start button. Panel will run unit thru entire curve.

(17) Check that completed flow gain curve is within limits shown on figure 710.



Flow Gain Curve - Servo Valve Test
Figure 710

F. Perform Flow Displacement Around Neutral Measurement Test

(1) Adjust Valve Flow Analyzer, Model 221.

(a) Turn servo - OFF

(b) Reduce pressure at P to zero.

(c) GPM/Inch - 0.05

(d) Inch/Inch - 0.002

(e) Amplitude - 0.0032

(2) Adjust Y axis zero to zero on flow gain curve around neutral.

(3) Apply 3000 psi at port P of test fixture.

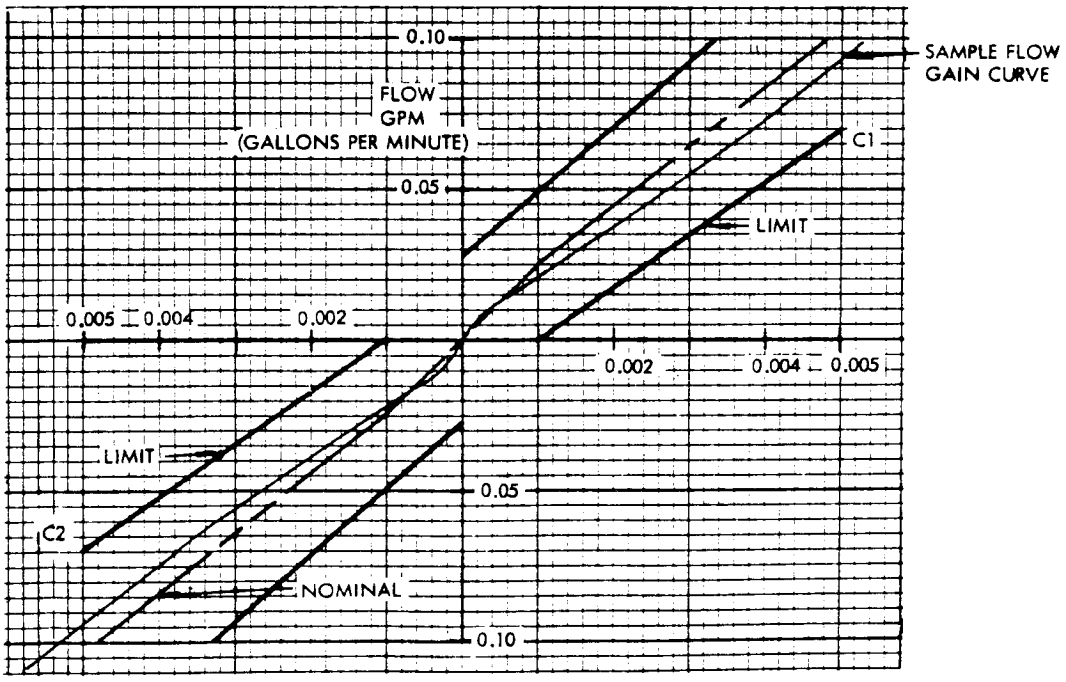
(4) Find hydraulic null by moving valve drive hand crank and observing Y axis on X-Y recorder.

(5) Adjust recorder X axis zero to zero on curve.

(6) On Valve Flow Analyzer, Model 221, turn servo ON and program to AUTO 2.

(7) Push start button. Panel will run unit thru entire curve. This completes flow plot around neutral.

(8) Check that completed flow plot around neutral is within limits shown on figure 711.



Flow Displacement Around Neutral - Servo Valve Test
Figure 711

G. Check Pressure Gain Plot

(1) Adjust Valve Flow Analyzer, Model 221.

(a) Program - Manual

(b) Turn Servo - OFF

(c) Reduce pressure at P to zero.

(d) Close C1 and C2 needle valves on test fixture.

(e) Set Y axis to P and amplitude to 0.0024 inch.

(2) Adjust Zeroing Panel Y range on recorder to 0.5.

(3) Set Pressure Control Unit, Model 806.

(a) Power - ON

(b) PSI/Inch - 1000

(c) Pressure Measurement - P1-P2

(4) Adjust Y axis to zero on pressure gain curve. Rough adjust X axis.

(5) Increase pressure to 3000 psi at port P of test fixture.

(6) Manually adjust valve to hydraulic neutral while watching Y axis.

(7) Adjust X axis of recorder to zero.

(8) On Valve Flow Analyzer, Model 211, turn servo ON and program to Auto 2.

(9) Push start button. Panel will run unit thru entire curve. This completes pressure gain plot.

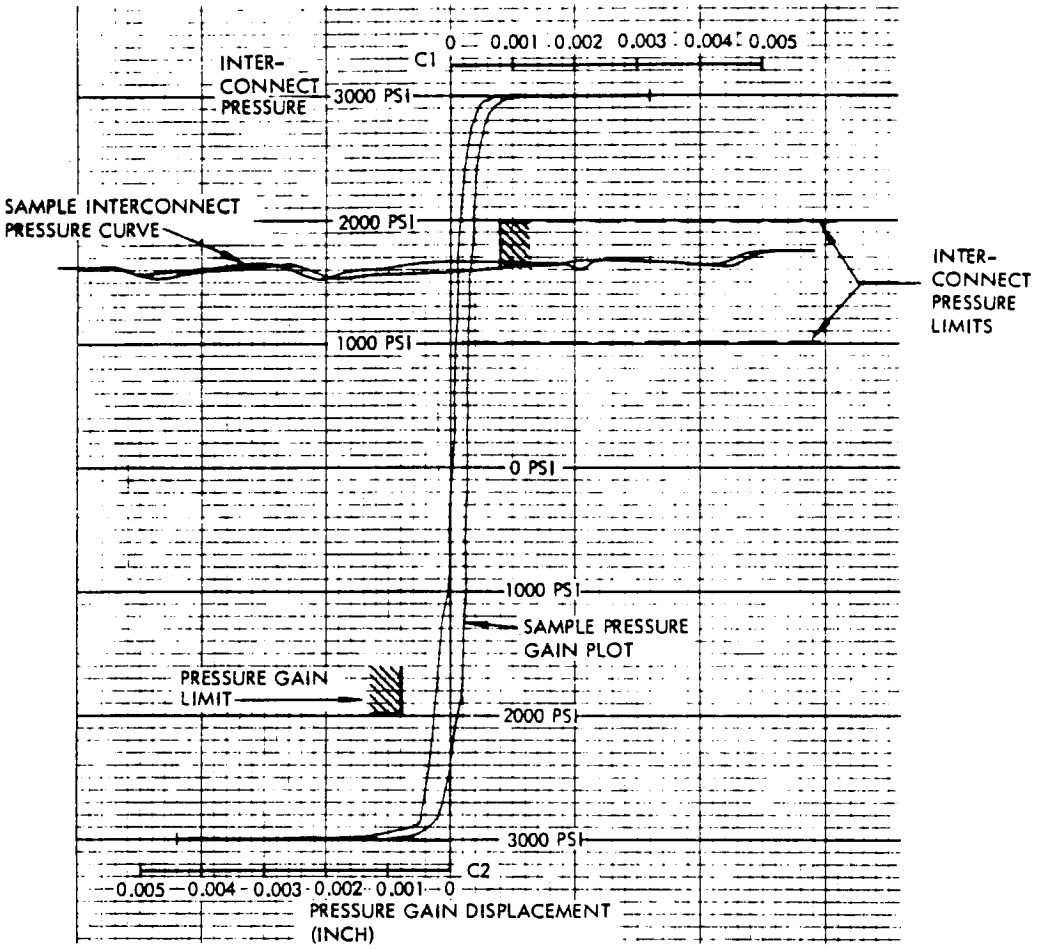
(10) Check that completed pressure gain plot is within limits shown on Fig. 712. Valve displacement from C2-C1 equal to 2000 psi, or C1-C2 equal to 2000 psi, must not exceed 0.0016 inch.

H. Deleted.

I. Perform Neutral Leakage Check

(1) Apply 3000 psi to pressure port with cylinder ports blocked.

(2) With valve in neutral position measure and record leakage from return port. Leakage must not exceed 100 cc per minute.



Pressure Gain Plot and Interconnect Pressure Limits Servo Valve Test
Figure 712

K. Perform Pull Check

(1) Apply 3000 psi to pressure port with cylinder ports interconnected and return port open to atmosphere.

(2) Displace valve through its entire stroke.

(3) Check that valve pull does not exceed 0.75 pound within the limits of the primary slide travel; does not exceed 1.0 pound within the limits of the secondary slide travel exclusive of spring force; and does not exceed 10 pounds maximum including spring force.

11. Manifold Assembly (Fig. 1106, 1106A) Pretest

NOTE: Refer to par. 13 for testing to determine extent of overhaul required.

A. (For manifold assemblies 65-44845-5, -10, -11, -14, -15) Cylinder Bleed Flow Test (Fig. 1106A)

(1) Install test manifold, F80170-1 in bypass valve cavity (Fig. 712A).

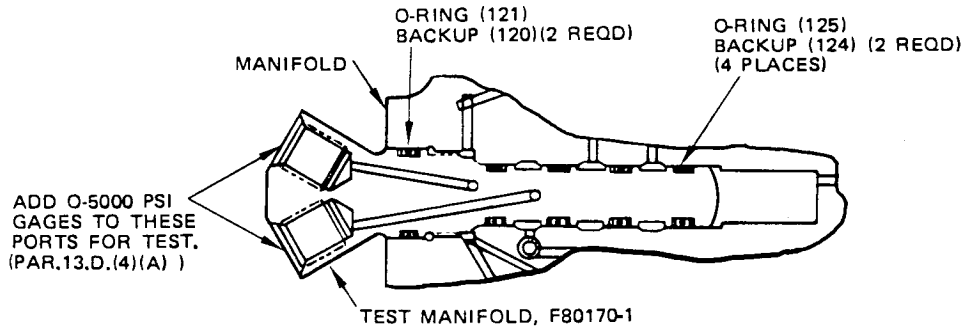
(2) Install test plug in cylinder bore to block fluid exchange between cylinder extend and retract passages and seal off to the outside (plug number to be determined).

(3) Plug all remaining openings except pressure and return ports (plug numbers to be determined).

(4) Apply fluid pressure to one port of test manifold, F80170-1, until air ceases to come out of other port.

(5) Apply 1500 psi fluid pressure to CE port on test manifold, F80170-1. Check that flow from CR port is 525-625 cc per minute and constant.

(6) Repeat step (5) except apply fluid pressure to CR port.



Test Manifold Installation
Figure 712A

B. Proof Pressure Test

(1) Plug all manifold openings except pressure and return ports (plug numbers to be determined). Apply 50-100 psi fluid pressure to pressure port until all air is removed from manifold. Shut off fluid pressure and plug return port.

(2) Apply 3000-psi fluid pressure to pressure port and hold for 2 minutes. Check that there is no evidence of leakage or permanent set. Reduce fluid pressure to 1-5 psi and hold for 2 minutes. Check that there is no leakage.

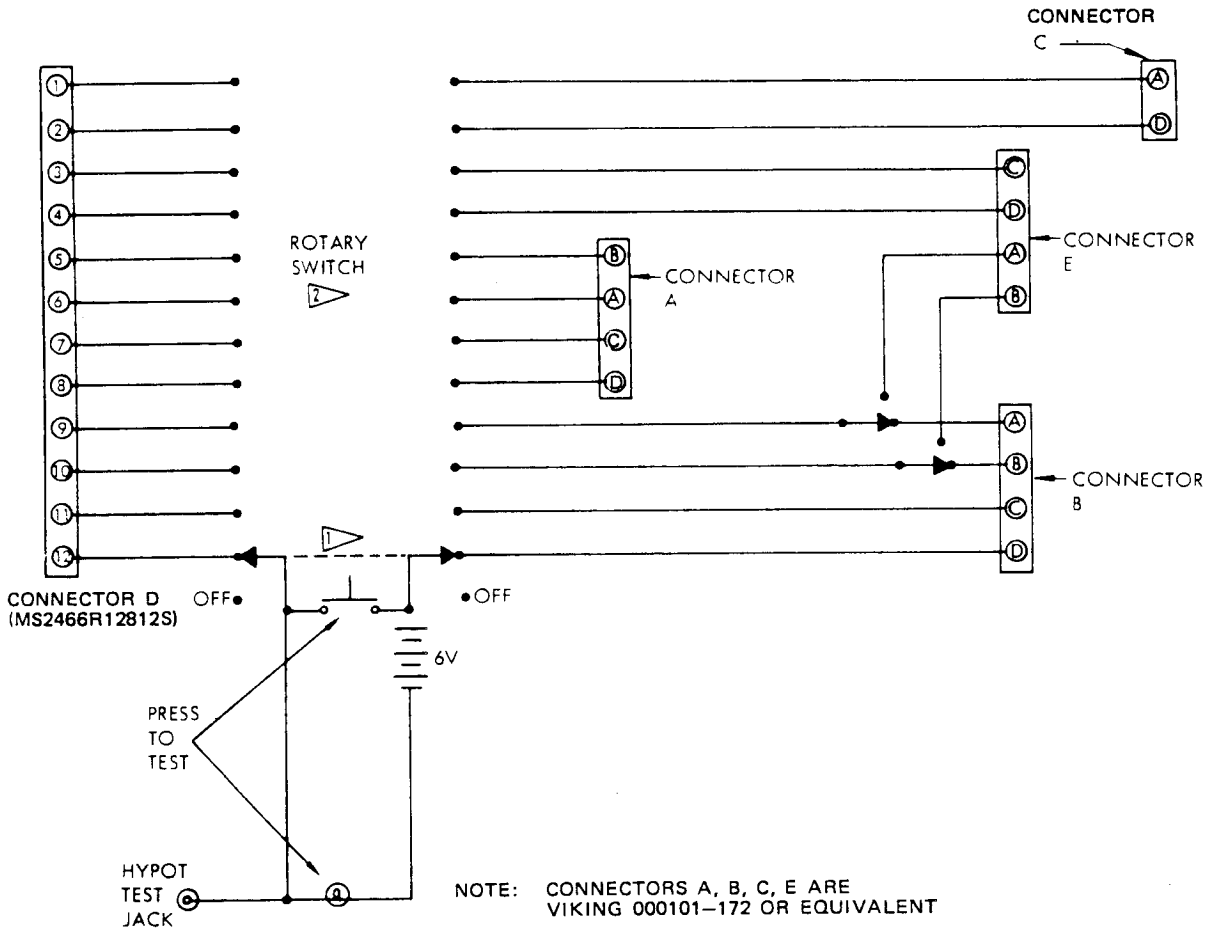
C. (For manifold assemblies 65-44836-1, -17, -19) Electrical Checks

(1) Check continuity and dielectric breakdown between pins. Pin to pin resistance measured at approximately 70°F with an ohmmeter must be as noted (Fig. 713).

(2) Check dielectric strength, power control unit.

(a) Plug connector of suitable dielectric switch box into connector (30, Fig. 1106) on power control unit manifold.

(b) Attach alligator clip on switch box pigtail to body of power control unit. Connect a hypot to switch box.



Manifold Hypot and Continuity Test Schematic
Figure 713

CAUTION: (1) ALWAYS LOWER VOLTAGE BEFORE SWITCHING CIRCUITS FOR EACH TEST.

(2) EXCESSIVE PERIODS OF TESTING WILL DAMAGE INSULATION. DAMAGE IS CUMULATIVE WITH SUCCESSIVE TESTS.

(c) With voltage at a low reading, turn switch box to proper position before raising voltage to test level. Apply test voltage between connections shown in Fig. 714. Allow the test voltage to stabilize for 30 seconds. There shall be no evidence of arcing or insulation failure.

Volts ac	Between	and Pins
1500	Body	Pin 1
1000	Pins 1, 5, 7, and Body Pins 1, 5, 7, and Body Pin 1 and Body Pin 1 and Body	Pin 11 Pin 9 Pin 5 Pin 7
800	Pin 5	Pin 7

Dielectric Strength Check
Figure 714

(3) Check Insulation Resistance, Power Control Unit

(a) Plug connector of suitable dielectric switch box into connector (30, Fig. 1106) of power control unit manifold.

(b) Attach alligator clip on switch box pigtail to PCU body of power control unit. Connect megger to switch box.

(c) With 500 volts applied by the megger, check for resistance between the various points shown in Fig. 715. Insulation resistance for in-service solenoid valve must be 10 or more megohms. Insulation resistance for new or overhauled solenoid valve must be 100 or more megohms.

NOTE: Voltage does not have to be lowered before switching circuits for each test.

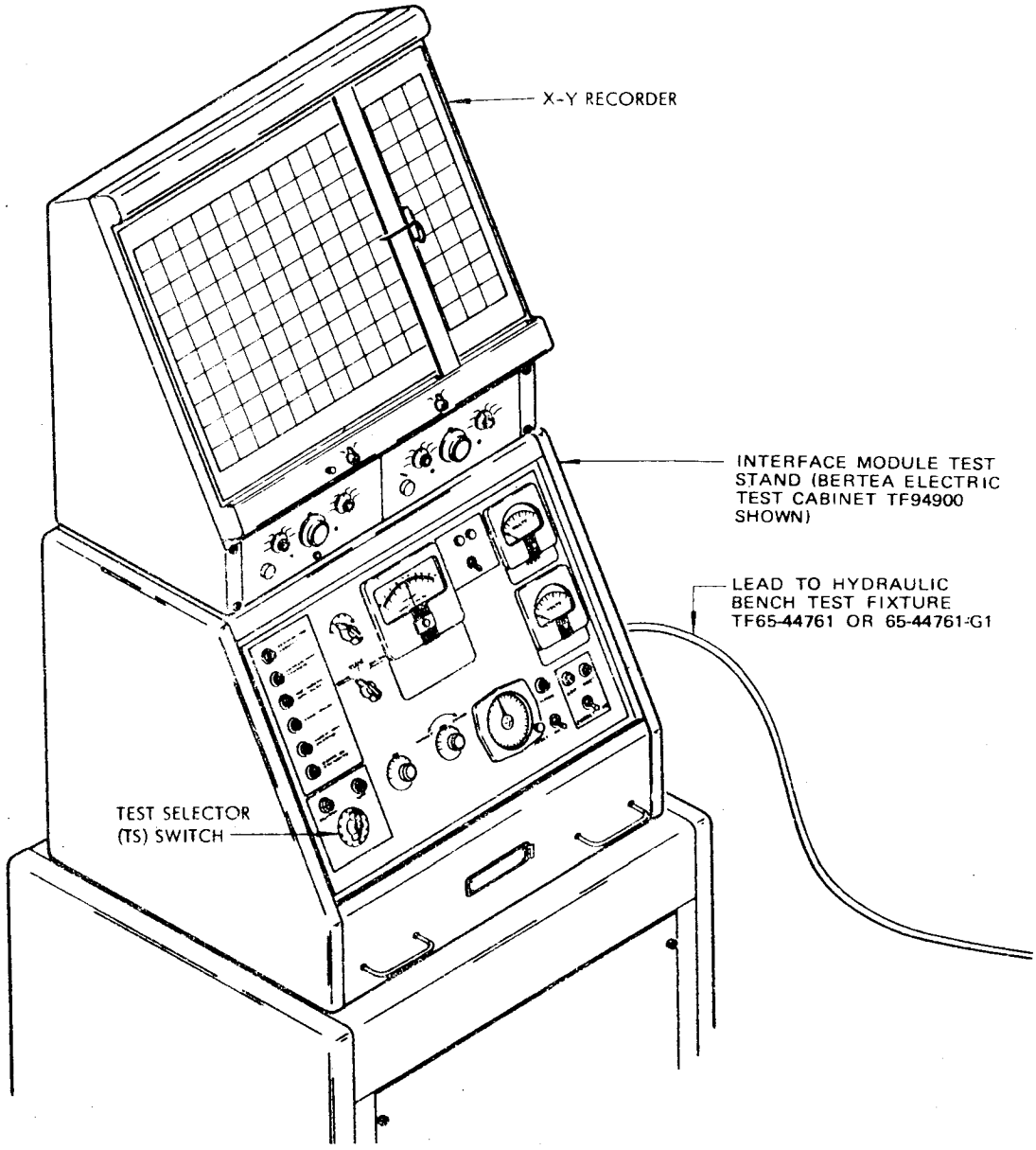
Volts dc	Between	and Points
500	Pins 1, 5, 7, 9, 11 Pins 5, 7, 9, 11 Pins 7, 9, 11 Pins 9, 11 Pin 9	Body Pin 1 Pin 5 Pin 7 Pin 11

Insulation Resistance Check
Figure 715

12. Hydraulic and Operational Tests - Completed Power Control Unit

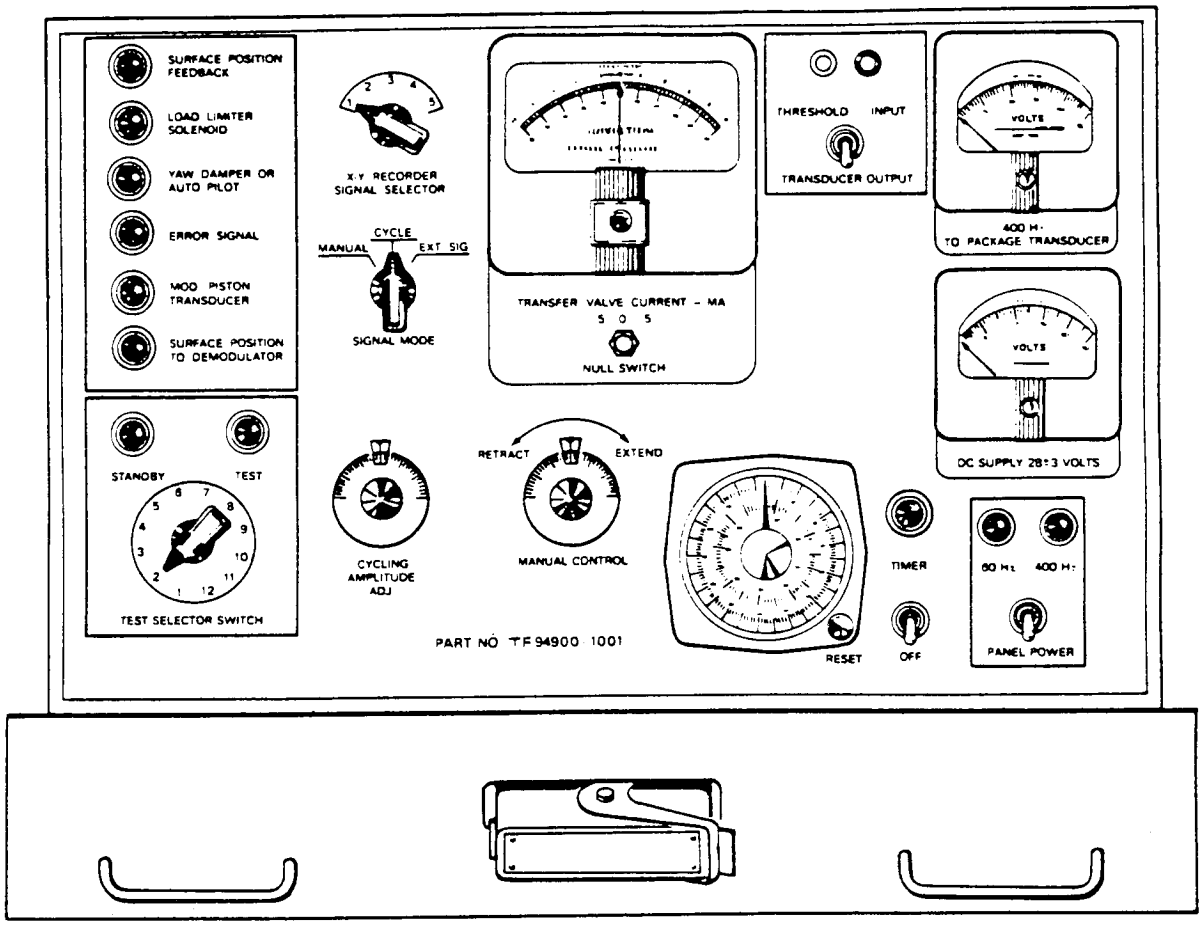
NOTE: Unless otherwise specified, perform tests with pressures of 3000 psi at pressure port and 45 psi at return port. The test cabinet referenced is TF 94900-1009 or TF 94900-1011 (Fig. 716). Switch positions referred to are on the TEST SELECTOR (TS) SWITCH. Use patch plug 65-44761-F8 and Cable Assemblies as required.

Refer to par. 13., for test limits of units in-service.



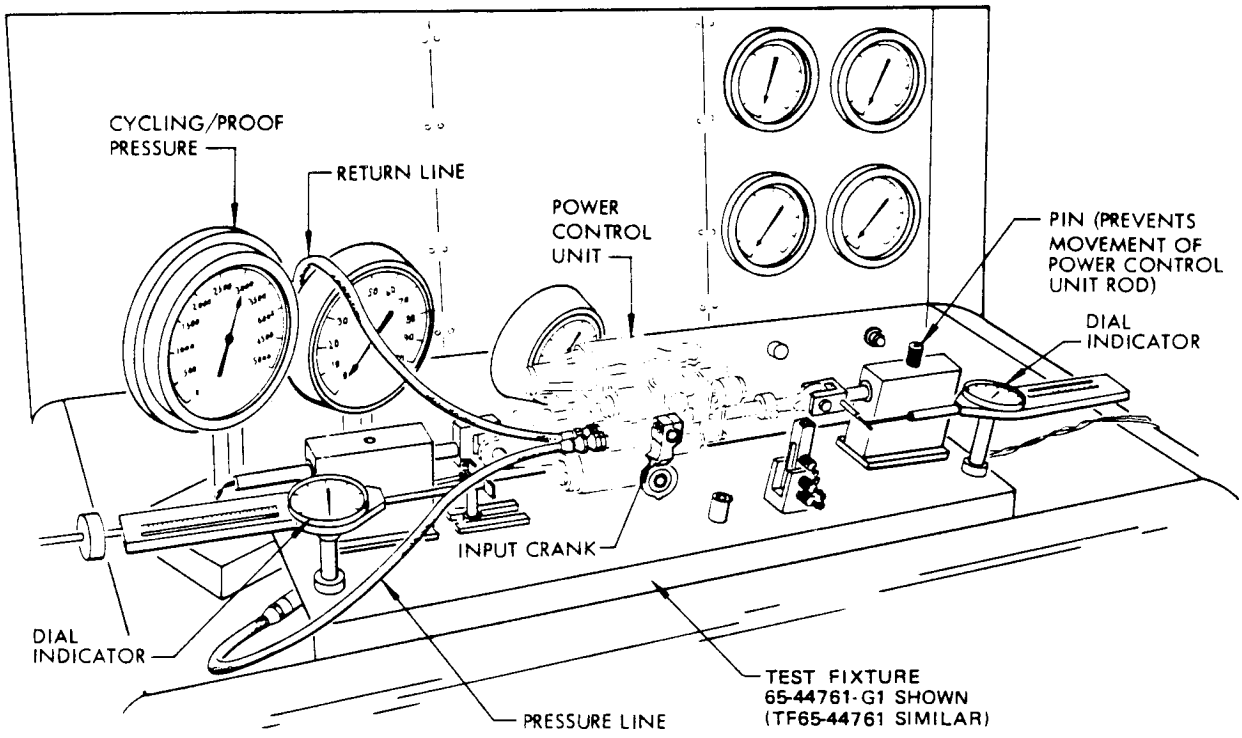
Electric Test Cabinet - Hydraulic Test
Figure 716 (Sheet 1)

TEST STAND CONTROL PANEL



Electric Test Cabinet - Hydraulic Test
Figure 716 (Sheet 2)

A. Install Control Unit in test fixture, TF65-44761 or 65-44761-G1 as shown in Fig. 717 and make electrical and hydraulic connections.



Power Control Unit Test Fixture Assembly
Figure 717

B. Cycle and Bleed Unit

(1) Perform this operation with the piston rod end (67, Fig. 1101) fixed, and the Electric Test Cabinet turned OFF.

(2) With return port open, apply 800-1000 psi fluid pressure to unit and cycle several times to remove air and ensure normal operation. Slowly increase pressure to 2800-3000 psi and cycle unit full stroke until free of air.

C. (For 65-44761-8, -9, -14, -17, -20) Cycle and Bleed PCU in Electrical Mode

(1) Set electric test cabinet to the following switch positions, as shown on Fig. 716. See Fig. 718 for chart of TS Switch position functions.

(a) Test Selector (TS) Switch to Position 2.

(b) X-Y Recorder Signal Selector to Position 1.

NOTE: The functional relationship of TS Switch/X-Y Switch positions is shown on figure 719.

CABINET TEST SELECTOR 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		
SOLENOID VALVE (LOAD LIMITER) (NOT USED)				X	X							
MOD PISTON TRANSDUCER				Ⓧ	Ⓧ	X				X		
SURFACE POSITION TRANSDUCER						X			X	X		
ERROR SIGNAL		X		X				X		X		

Ⓧ TO TRANSDUCER OUTPUT

Test Selector (TS) Switch Positions
Figure 718

X-Y RECORDER SELECTOR SWITCH POSITION	1	2	3	4	5
CABINET TEST SELECTOR (TS) SWITCH POSITION	6,9,10		9	10	
SURFACE POSITION	X		Y	Y	Y
TEST FIXTURE FORCE TRANSDUCER	Y	Y			
INPUT DISPLACEMENT		X	X		
TRANSFER VALVE INPUT				X	X

Functional Relationship for TS Switch/X-Y Switch Positions
Figure 719

(c) Signal Mode Switch to CYCLE.

(d) Threshold Input/Transducer Output (TI/TO) toggle DOWN.

(2) Apply 800-1000 psi fluid pressure to pressure port and open return port. Allow unit to cycle as required to remove all air. Slowly increase fluid pressure to 2800-3000 psi and cycle the unit full stroke until free of air.

(3) Repeat cycling in electrical mode by applying 28 volts dc to solenoid (7, Fig. 1101) and a dc signal as necessary to Electrohydraulic (transfer) servo valve (11, Fig. 1101).

NOTE: Operation of unit in autopilot mode may not be possible if engage cam mechanism position prevents actuator motion in both directions. If this condition exists, adjust engage cam per par. 12.M. and repeat test.

D. Perform Proof Pressure Test

CAUTION: DO NOT ACTUATE UNIT DURING APPLICATION OF PROOF PRESSURE.

(1) Check pressure system (65-44761-8, -9, -14, -17, -20)

(a) Perform this check with the piston rod end fixed, actuator in the fully retracted position, and the electric test cabinet ON.

(b) Set Test Selector (TS) switch to Position 2, Signal Mode switch to MANUAL, TI/TO toggle DOWN and X-Y Selector to Position 1.

(c) With return port open, input arm against RETRACT stop, autopilot engage mechanism blocked, and the electrical system energized, turn manual control on test cabinet to RETRACT. Gradually increase fluid pressure to 5400 psi to pressure port and hold for 2 minutes. Check for leakage and deformation.

(d) Reduce pressure to 1-5 psi and hold for 2 minutes. Check that there is no leakage.

(e) Repeat steps (a) thru (d) in opposite direction.

(2) Check pressure system (65-44761-10, -12, -15, -16, -18, -19, -21, -22)

(a) Perform this check with the piston rod end fixed, and the actuator in the fully retracted position.

(b) With return port open, input arm against RETRACT stop, gradually apply 5400 psi to pressure port, and hold for 2 minutes. Check for leakage and deformation.

(c) Reduce pressure to 1-5 psi and hold for 2 minutes. Check that there is no leakage.

(d) Repeat steps (a) thru (c) in opposite direction.

(3) Check return system.

(a) Turn electrical system OFF.

(b) With return port plugged, and the input arm at neutral, apply 3000-psi fluid pressure at pressure port and hold for 2 minutes. There shall be no external leakage or permanent set.

(c) Reduce fluid pressure to 1-5 psi and hold for 2 minutes. There shall be no external leakage.

E. Perform Cylinder Friction Test

(1) Perform test with piston rod end (67, Fig. 1101) fixed, and the electrical test cabinet turned OFF.

(2) Remove hydraulic pressure from pressure and return ports.

(3) Apply an axial force to the actuator end fitting and slowly cycle the unit one full stroke.

(4) Use a spring scale or other measuring device to check breakaway and running force. This force must not exceed 20 lbs, except in the end snubbing stroke region, which must not exceed 60 lbs.

NOTE: End snubbing stroke region is within 0.35 inch from either the fully retracted or fully extended position.

F. Check Input Friction

(1) Perform test with manifold end fixed, and electric test cabinet OFF.

(2) Open return port and apply 3000-psi fluid pressure to pressure port.

(3) Measure force (at input crank bearing centerline) required to displace input arm from neutral position to a distance where the spring loaded sleeve of the servo valve is engaged. Record force and repeat in the opposite direction.

(4) The force in either direction shall not exceed 1/2 lb.

(5) Measure force required to displace input arm from neutral position to extend and retract stops.

(6) The force in either direction shall not exceed 10.5 lbs.

G. Perform Bypass Actuation and Deactuation Pressure Test

(1) Perform test with piston rod end fixed and electrical test cabinet turned OFF.

(2) Open the return port.

(3) Autopilot system off (For 65-44761-8, -9, -14, -17, -20).

(4) Press input arm against the mechanical stop, in either fully extend or fully retract position. Check that piston rod is in neutral position.

(5) Apply pressure gradually to the pressure port until rod moves. Check that pressure is 500-680 psi when movement begins.

(6) Gradually reduce pressure to pressure port. Record pressure at which rod movement ceases. The difference between actuation and deactuation pressure must be within 50 psi.

H. Check Polarity and Phasing (For 65-44761-8, -9, -14, -17, -20)

(1) Fix one end of unit in test fixture. Apply 3000-psi fluid pressure to pressure port and switch electric test cabinet to ON.

(2) Apply 28 volts dc to pins 1 and 2, with pin 1 positive.

(3) Apply 8 volts dc to pins 5 and 6, with pin 5 positive, check that actuator extends.

(4) Apply 8 volts dc to pins 7 and 8, with pin 8 positive, check that actuator retracts.

(5) Tie pins 9 and 11 together to the common lead of 26 volts ac power supply. Apply 26 volts ac to pin 10 and 8 volts dc to pins 7 and 8 with pin 8 positive, check that ac voltage at pin 12 is in phase with voltage in pin 10.

I. Check External Seal Leakage

(1) Perform check with manifold end fixed, and electric test cabinet OFF.

(2) With return port open and the electrical system de-energized, apply 3000-psi fluid pressure to pressure port and manually cycle unit a minimum of 100 full cycles.

(3) Check that leakage from each piston rod seal does not exceed one drop per 25 full cycles, and that leakage across input shaft seal does not exceed one drop per 100 cycles.

J. Check Input Arm Position at Manual Servo Null and Arm Travel

(1) Perform test with the manifold end fixed, and electric test cabinet OFF.

(2) Establish valve null position by moving input arm assembly (21, Fig. 1101) to extend and retract positions, determining null position on each side of dead center by feel. Set input arm in null position in midpoint of deadband.

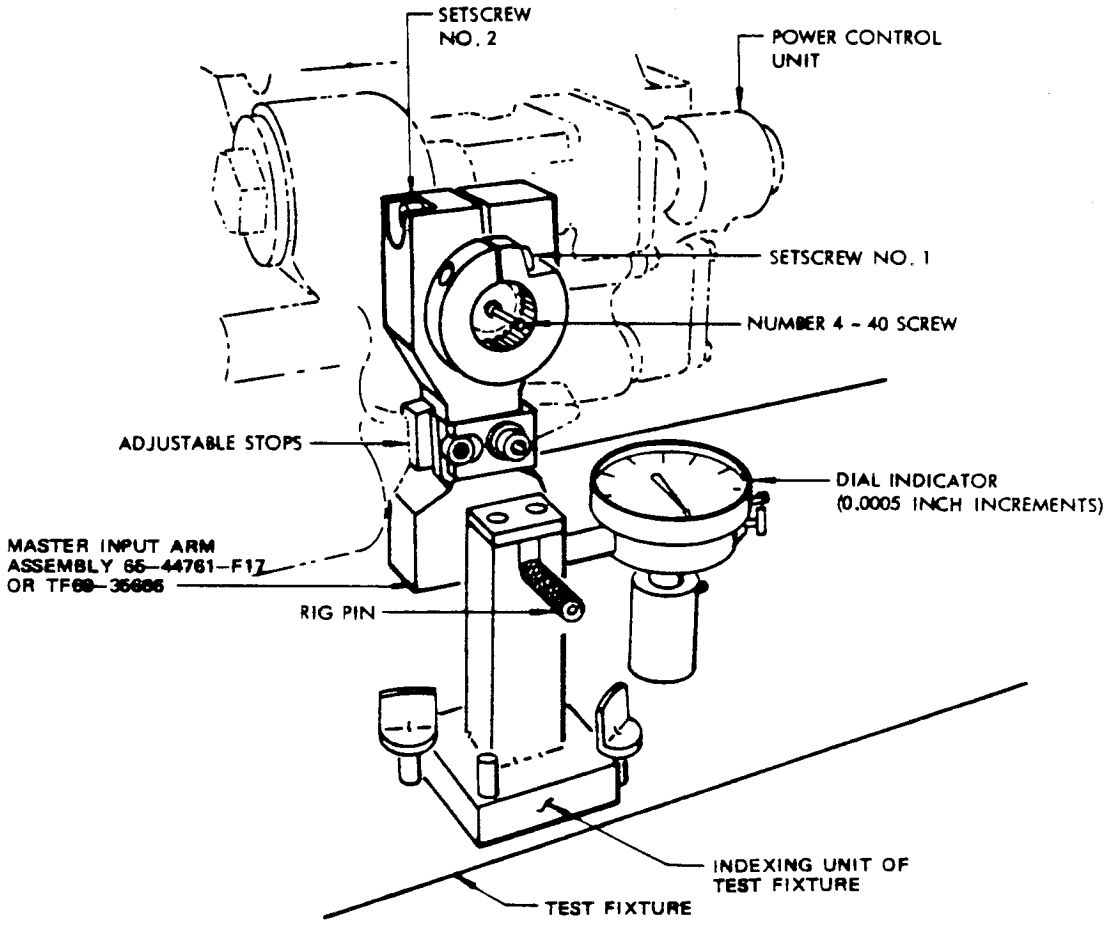
(3) With return port open and 3000-psi fluid pressure at the pressure port, measure and record input travel (each way) from valve null position to the manifold stop.

(4) Check that measured travel is 0.145-0.160 inch in each direction. If limits are not met, install and calibrate an input arm (21, Fig. 1101) as follows:

(a) Place a suitable spacer (30, Fig. 1101, or equivalent) on shaft assembly (34, Fig. 1101), so that master input arm 65-44761-F17 or TF 69-35666 will clear radius on shaft.

(b) Install master input arm 65-44761-F17 or TF 69-35666, as shown on Fig. 720, to as close a position to valve null as can be determined.

(c) Tighten setscrew No. 2 on master arm to clamp unit securely on shaft. Tighten setscrew No. 1 which clamps on split ring on tool (Fig. 720).



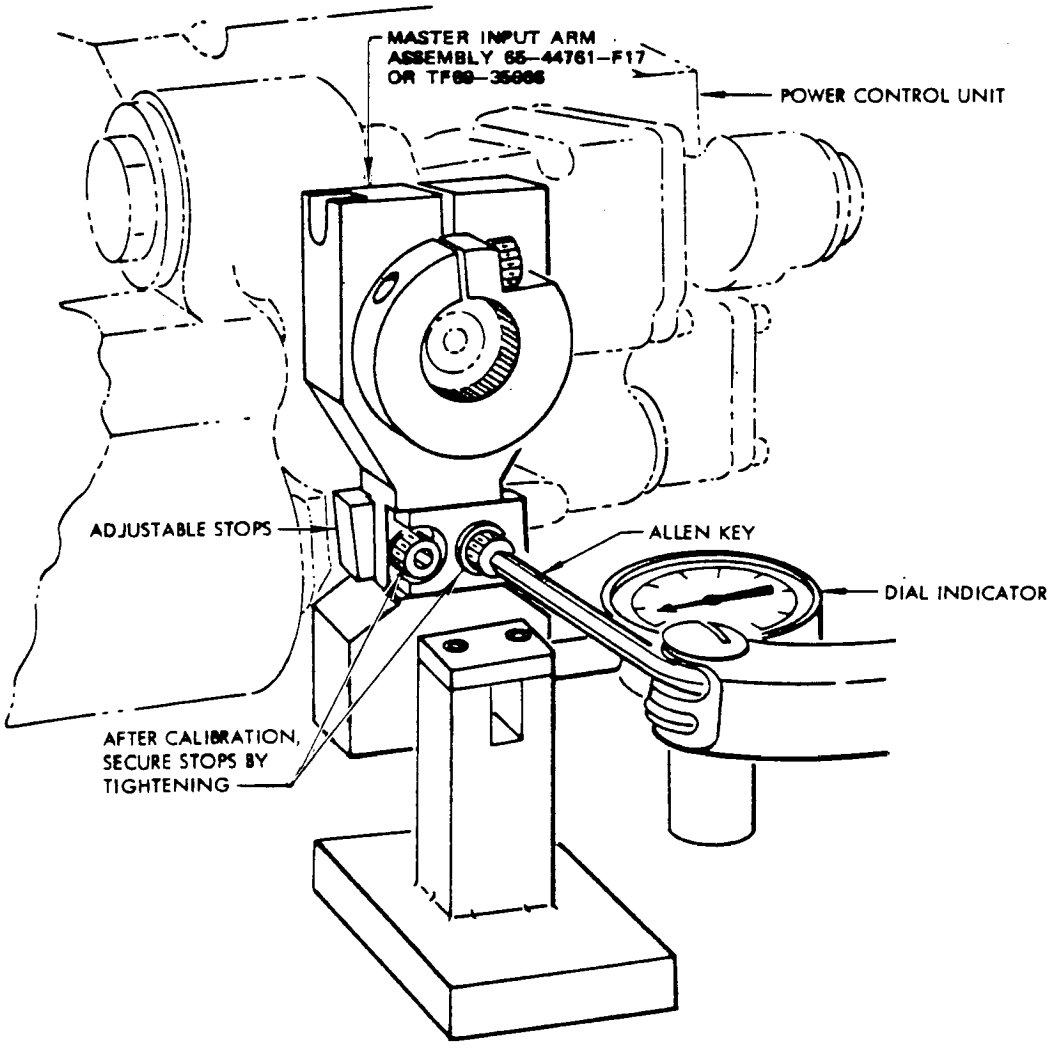
Installing Master Input Arm Assembly
Figure 720

(d) Install indexing unit of test fixture. Place rig pin through this unit and master arm. Set dial indicator to zero.

NOTE: Indicator should be at zero in center of "play" at valve null position.

(e) Screw a 4-40 screw into center on input shaft and pull shaft outward to prevent excessive end play during calibration.

(f) Remove rig pin and move master arm in either direction. Check total travel on dial indicator. Move adjustable stop on master arm to provide a 0.150-inch stroke as shown in Fig. 721. Tighten setscrew. Move master arm in opposite direction and provide 0.150-inch stroke as measured on dial indicator. Readjust stops as required to provide correctly calibrated stroke in each direction.



Calibrating Master Input Arm Assembly
Figure 721

(g) After master arm is calibrated reset rig pin. Loosen only setscrew No. 2 and remove master arm.

(h) Install master arm in machining fixture 65-44761-F19 (or MF165-44761 and MF265-44761). Using master arm to position part and fixture, machine profile of stop faces on new input arm assembly (21, Fig. 1101), or repair used arm assembly per Fig. 721A.

NOTE: An input arm previously installed and used may be re-used if repaired as shown in Fig. 721A.

(i) Identify new or repaired arm assembly with same number as the power control unit. After calibration and machining, arm and power unit are matched parts and must be retained and used as a matched set.

K. (For 65-44761-8, -9, -14, -17, -20) Measure Cylinder Stroke and Transducer Output, Output Neutral Position and Flow (52, Fig. 1101)

(1) Perform check with piston rod end fixed and electric test cabinet ON.

(2) Set test cabinet TS switch to Position 4, Signal Mode switch to MANUAL, TI/TO toggle DOWN, and X-Y Selector to Position 1, thereby energizing the LVDT.

(3) With the return port open, apply 3000 psi to pressure port.

(4) Move input arm as required to achieve lowest LVDT output. This voltage is the transducer output at null (transducer null) and must not exceed 150 mv.

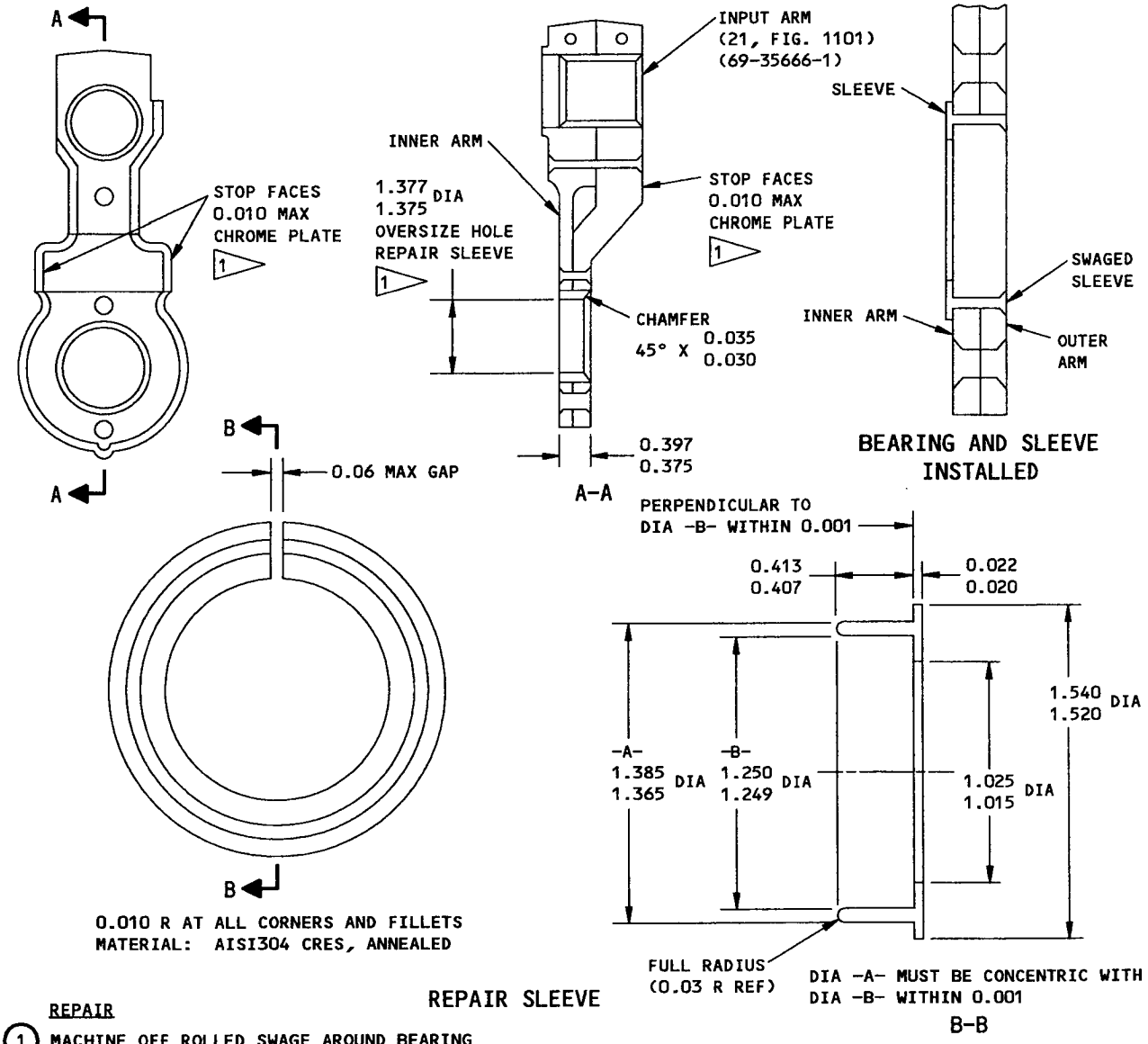
(5) At position obtained in (4), measure and note distance between bearing centerlines of end fitting and rod end, to obtain actuator length at transducer null. This measurement must be within range of 18.982-19.018 inches.

(6) Measure and note flow from return port. This is neutral flow and must not exceed 300 cc/minute.

(7) Manually move main servo valve to yield full extend and full retract actuator stroke and measure and record length of actuator at each position. Check that piston movement (measured between bearing centers) versus transducer output are:

(a) 20.71-20.77 inches extended and 18.8-22.1 volts ac

(b) 17.25-17.31 inches retracted and 18.6-21.9 volts ac



REPAIR SLEEVE

REPAIR

(1) MACHINE OFF ROLLED SWAGE AROUND BEARING AND REMOVE BEARING FROM ARM

(2) MACHINE HOLE OVERSIZE TO DIA SHOWN PER 20-10-02. MAGNETIC PARTICLE EXAMINE PER 20-20-01. (LOCATION ESTABLISHED IN FIXTURE USING CALIBRATED MASTER ARM) CHAMFER OUTER ARM SIDE

(3) BUILDUP STOP FACES WITH HARD CHROME PLATE PER 20-42-03 AS REQUIRED. ALTERNATE REPAIR: APPLY A BOND LAYER OF BMS 10-67, TYPE XII TO A MAXIMUM THICKNESS OF 0.005 INCHES, APPLY BMS 10-67, TYPE VIII TO A MAXIMUM THICKNESS OF 0.035 INCHES, MACHINE TO DRAWING DIMENSIONS AND PERFORM MAGNETIC PARTICLE INSPECTION PER OHM (20-20-01)

(4) MANUFACTURE REPAIR SLEEVE INSTALL SLEEVE IN ARM

(5) INSTALL BEARING (28, FIG. 1101) IN SLEEVE AND ROLLER SWAGE SLEEVE FULL CIRCUMFERENCE PER 20-50-03 (REF TOOL ST929-1A). CHECK THAT BEARING TURNS FREELY WITHIN MAX TORQUE OF 0.75 OZ-IN'.

1 LOCATE AND POSITION PART WITH MASTER ARM INSTALLED IN MACHINING FIXTURE 65-44761-F19 OR MF165-44761 AND MF265-44761 MACHINE AS REQUIRED

MATERIAL: ARM (22,23), 17-4PH CRES 180-200 KSI

ALL DIMENSIONS ARE IN INCHES

Input Arm Repair
Figure 721A

L. (For 65-44761-10, -12, -15, -16, -18, -19, -21, -22) Check Neutral Flow

(1) Place piston rod near midpoint (out of snubbing range) and return port open.

(2) With input crank neutrally positioned between stops, apply 3000 psi to the pressure port.

(3) Measure and note flow from return port. Flow must not exceed 300 cc per minute.

M. (For 65-44761-8, -9, -14, -17, -20) Check Electrical Servo Null and Internal Leakage

(1) Perform test with manifold end fixed, and electronic test cabinet ON.

(2) Set test cabinet TS switch to Position 2, Signal Mode switch to MANUAL, TI/TO toggle to DOWN, and X-Y Selector to Position 1.

(3) Loosen lock retainer plug (96, Fig. 1101) using autopilot shaft torque wrench adapter, 65-44761F20 or AT 69-35694.

(4) Adjust autopilot engage cam to null servo valve. Position eccentric cam so that with solenoid energized, clockwise rotation on cam will retract piston rod (Fig. 722).

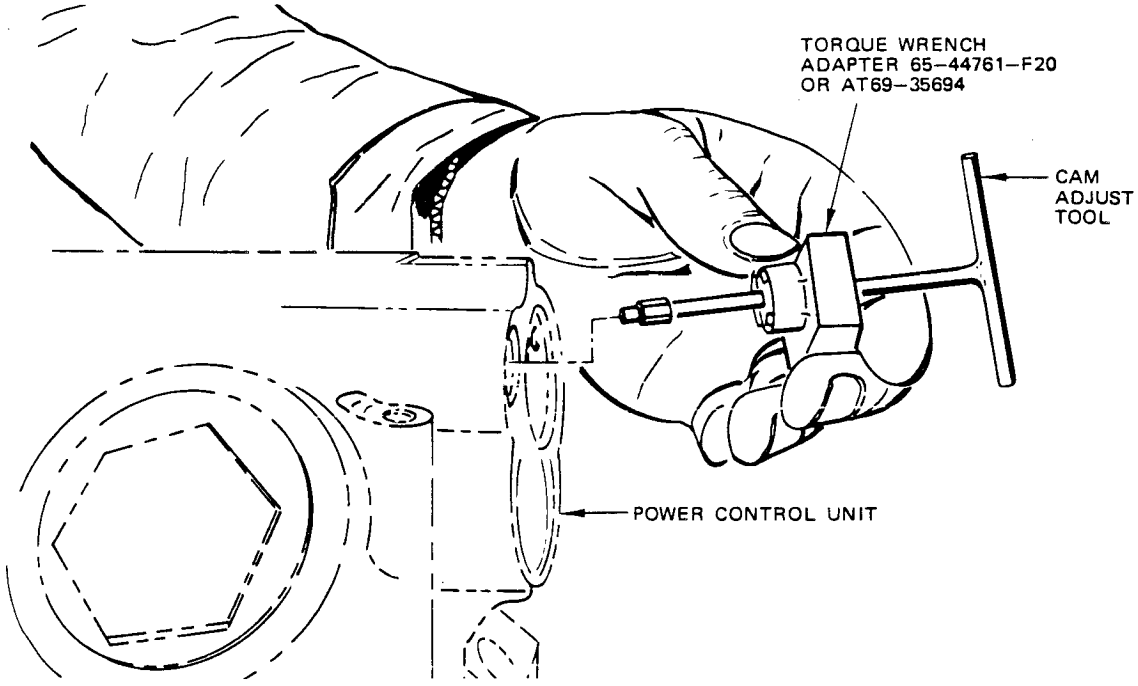
(5) With return port open, 3000-psi fluid pressure at pressure port, main servo valve at neutral, and electrical system ON, adjust eccentric pivot of auto-engage cam to produce little or no actuator motion, with TI/TO toggle UP.

(6) Check that dc input to the electrohydraulic (transfer) valve does not exceed 0.30 MA and valve position is maintained. Record amperage value.

(7) Using either internal hex (Allen) wrench, adapter 65-44761F20, or adapter AT69-35694 inserted through retainer plug (96) and locking plate (97) to hold auto-engage cam in position, position locking plate (97) against pivot shaft (99) so that mating serrations are properly engaged. In this position tighten plug (96) to 95-105 lb-in.

(8) Measure and note the null flow from return port. Flow from return port must not exceed 1050 cc per minute.

(9) If above values are not obtained, readjust eccentric pivot until unit meets requirements. The cam may be backed off the correct setting a few degrees, so that when retainer plug is tightened and bears on cam, it carries cam around to the correct setting.



Adjustment Tool for Positioning Eccentric Cam
Figure 722

N. (For 65-44761-8, -9, -14, -17, -20) Perform Electrical Servo Authority (Manual Override) Test

(1) Perform check with end of piston rod fixed, and electrical test cabinet turned ON.

(2) Set test cabinet TS switch to Position 10, Signal Mode switch to MANUAL, TI/TO toggle to DOWN X-Y Selector to Position 2, and X-Y Plotter Settings as follows:

(a) X-Axis -- DC Duar 10 , Transducer output 1, Calibration 1 inch = 0.025 inch

(b) Y-Axis -- DC Duar 10 , Transducer output 2, Calibration 1 inch = 25 pounds

(3) Set dial indicators to measure input arm position relative to the manifold, and piston arm position relative to manifold.

(4) Restrain the input arm and install a transducer to measure the force at input arm in a direction along the centerline of the input rod. Connect this transducer to Y-axis of X-Y plotter (Fig. 723).

(5) Apply at least 25 manual override cycles in both the extend and retract directions.

(6) With the electrical system energized, unit nulled in approximately mid position, 3000-psi fluid pressure at port P and the return port open, gradually apply an electrical dc extend signal of 9.5-10.0 ma to the electrohydraulic servo (transfer) valve.

(7) As the unit moves and stalls, record measured load at input arm using X-Y plotter. Record displacement of input arm relative to manifold.

(8) If force measured does not lie within range of 90-95 lb, adjust the force on the auto-engage spring (103, Fig. 1101) as required to meet this value. Using Wrench 65-44761-F13 or AT 69-35669-1, tighten guide (102, Fig. 1101) to achieve proper loading. One turn equals about 4-lb force at input crank.

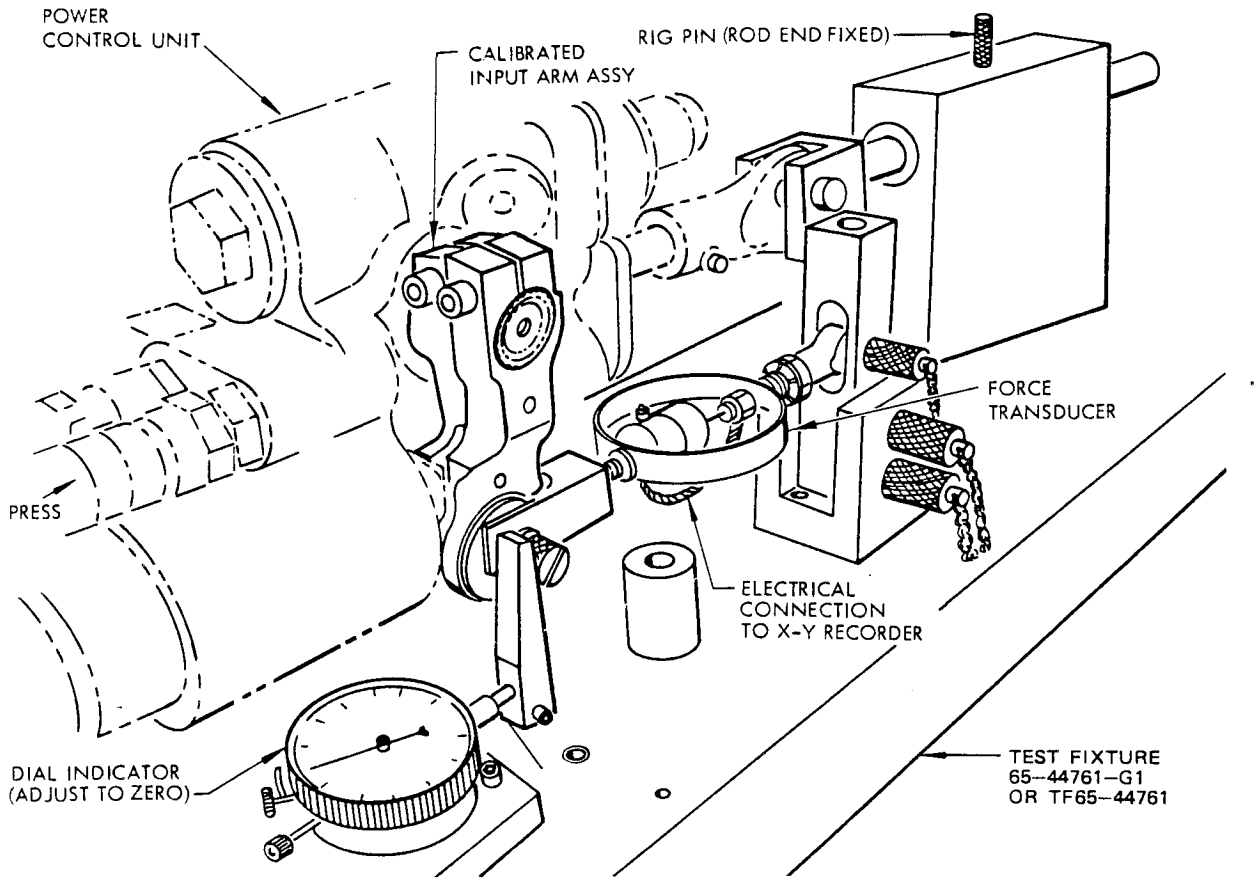
(9) When force measured is within range of 90-95 lb, repeat steps (6) and (7) above except apply electrical dc retract signal of -9.5 to -10.0 ma to electrohydraulic (transfer) valve.

(10) As the unit moves and stalls, check that force imposed on the input crank is 84-92 lbs.

NOTE: Step (8) adjustment is not required in retract direction.

(11) After test is successfully completed, install locking device (101, Fig. 1101) and locknut (100, Fig. 1101). Tighten locknut (100) to 30-40 lb-in.

(12) Install retainer (94), with installed O-ring, in manifold. Tighten to 145-160 lb-in.



Servo Authority (Manual Override) Test Setup
Figure 723

P. (For 65-44761, -9, -14, -17, -20) Check Autopilot Engage Override Force

(1) Perform check with manifold end fixed and electrical test cabinet turned ON.

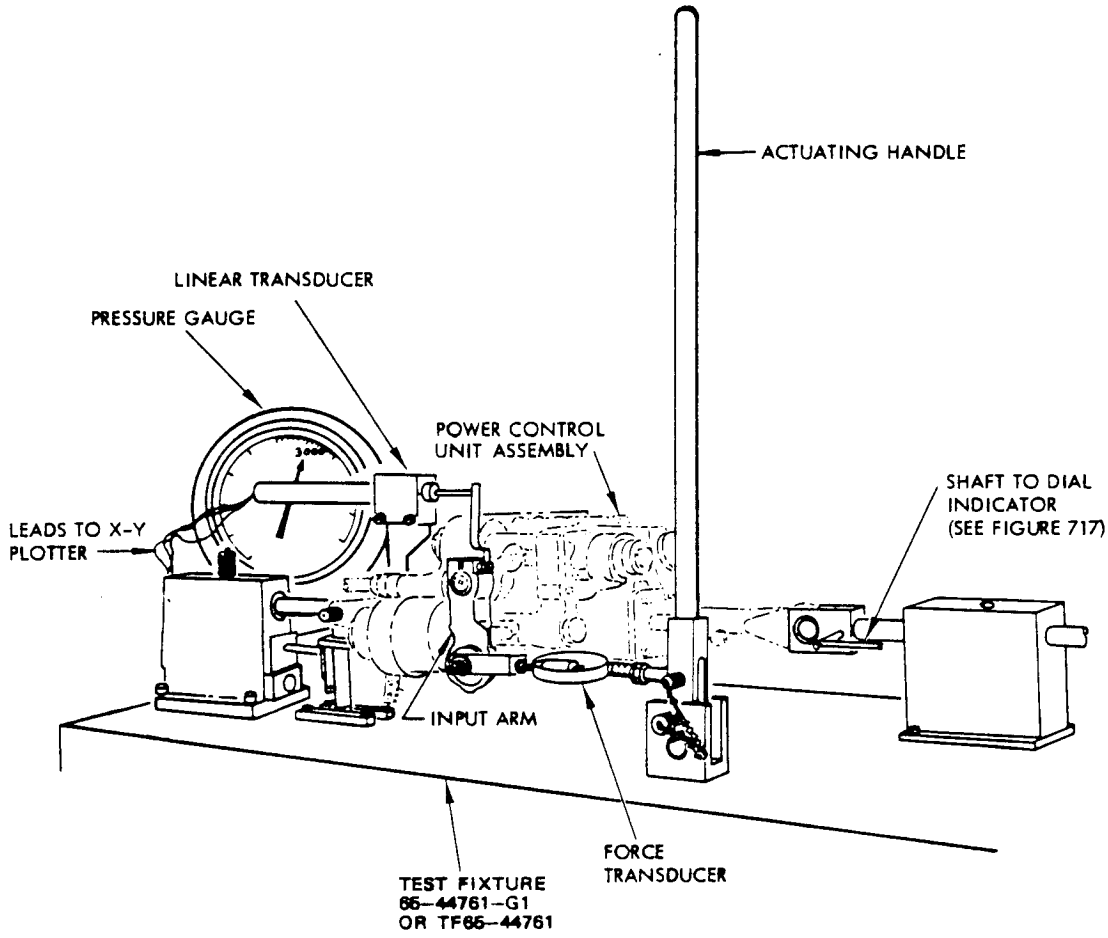
(2) Set test cabinet TS switch to Position 10, Signal Mode switch to MANUAL, TI/TO toggle to DOWN and X-Y Selector to Position 2, and X-Y Plotter Settings as follows:

(a) X-Axis -- 10 , Transducer output 1, Calibration 1 inch = 0.025 inch

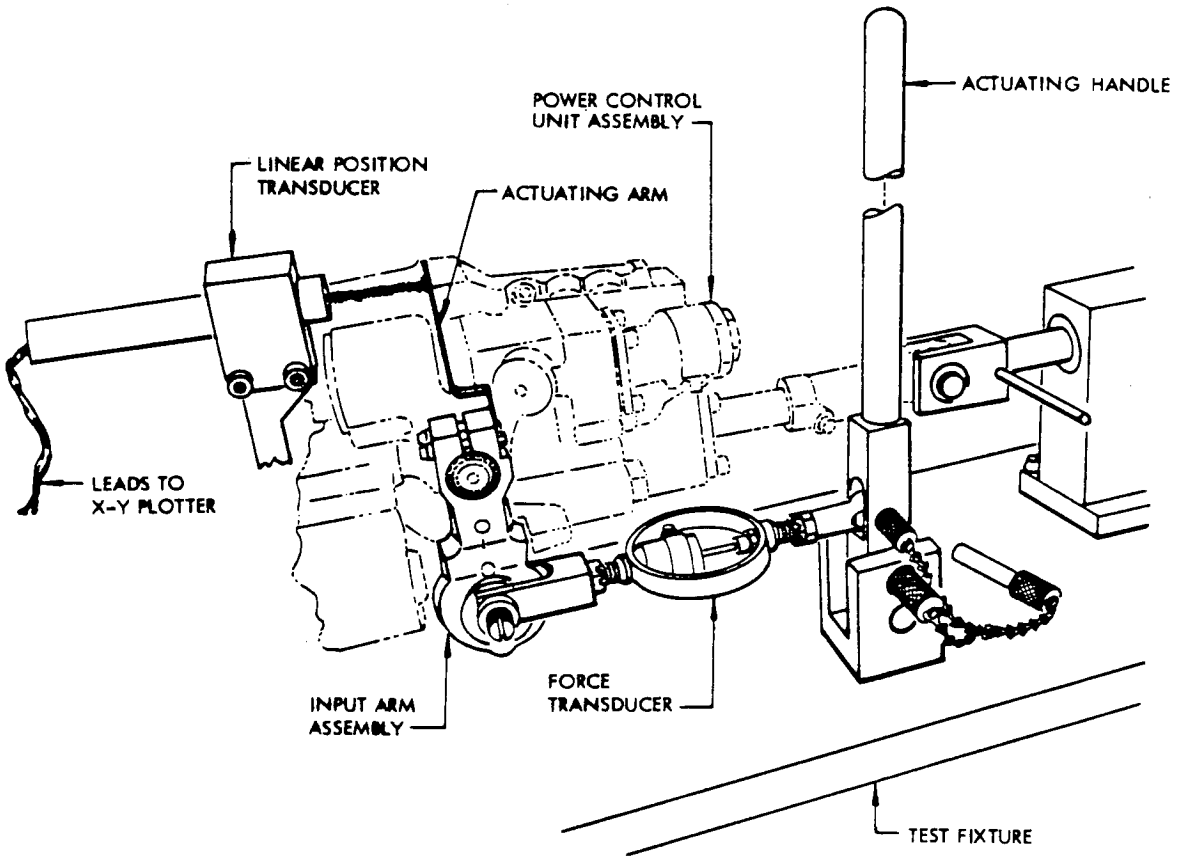
(b) Y-Axis -- 10 , Transducer output 2, Calibration 1 inch = 25 pounds

(3) Install transducer to measure force at input arm along the centerline of input rod (Fig. 724).

(4) With the autopilot system turned ON and nulled, 3000 psi fluid pressure at port P and the return port open, gradually apply force in either direction to the input arm until the piston rod starts to move. Record force registered when piston rod starts to move.



Measuring Autopilot Override Force
Figure 724 (Sheet 1)

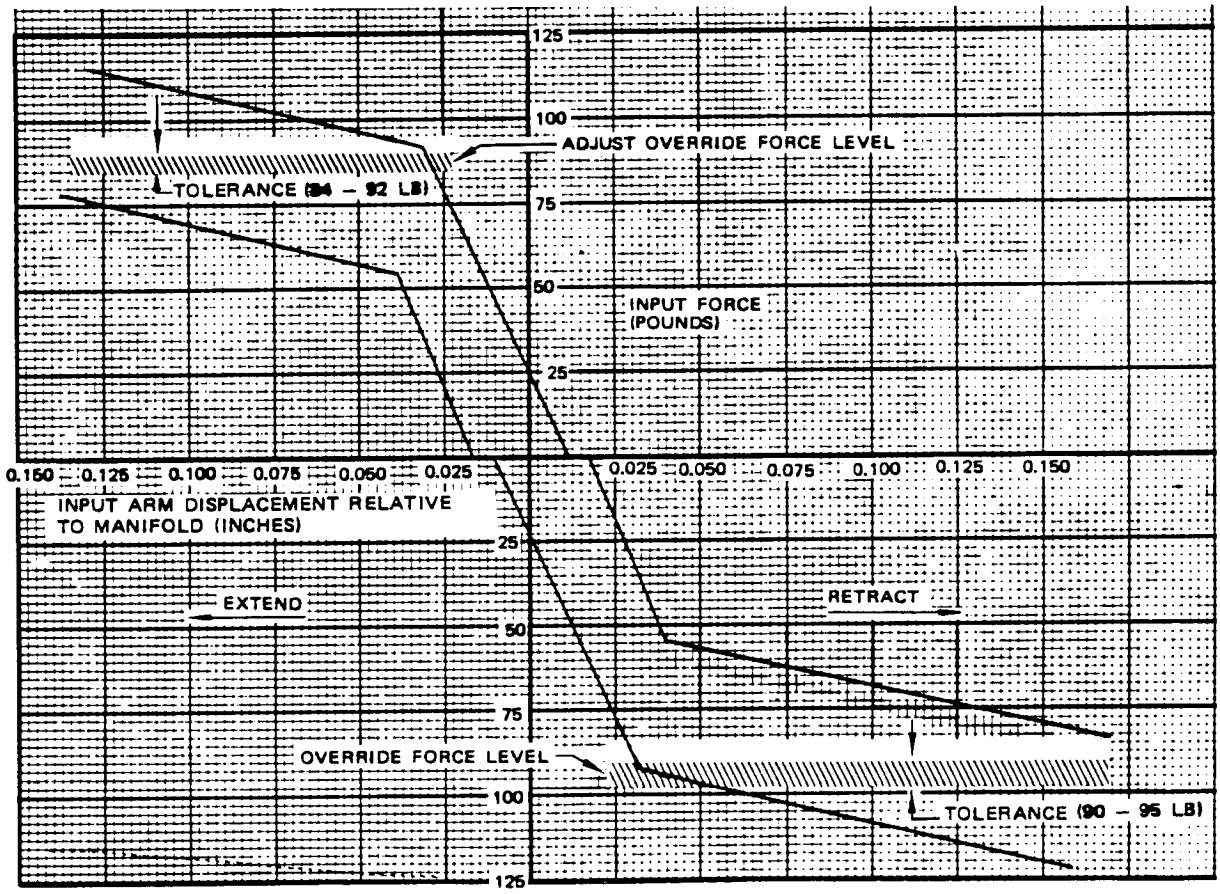


Measuring Autopilot Override Force
Figure 724 (Sheet 2)

(5) Slowly increase force until input arm hits the mechanical stop on the manifold.

(6) Repeat steps (4) and (5), applying force in opposite direction, then allow arm to return to zero force position.

(7) Using X-Y plotter plot a hysteresis curve of force versus position. Check that values are within limits of Fig. 725.



Autopilot Engage Cam Force Curve
Figure 725

Q. Perform Actuator Velocity and Snubbing Test

(1) Manual (All dash numbers)

(a) Perform test with piston rod end fixed and electrical test cabinet ON.

(b) Set test cabinet TS Switch to Position 9 (surface position transducer), Signal Mode Switch to MANUAL, TI/TO toggle to DOWN and X-Y Selector to Position 3. Set X-Y plotter as in steps P.(2)(a) and (b) preceding. Connect linear position transducer to monitor piston position relative to manifold.

(c) Connect surface position transducer to record piston velocity versus piston position.

(d) Open return port and apply fluid pressure of 3000 psi to pressure port.

(e) With cylinder fully retracted, place input handle to extend position and record velocity versus piston position on X-Y plotter.

(f) Check that tracing complies with limits of Fig. 726.

(g) Repeat step (e), except check actuator retraction from extend position, moving input handle to retract position.

(2) (For 65-44761-8, -9, -14, -17, -20) Electrical (Optional Check)

(a) Perform test with piston rod end fixed and electrical test cabinet ON.

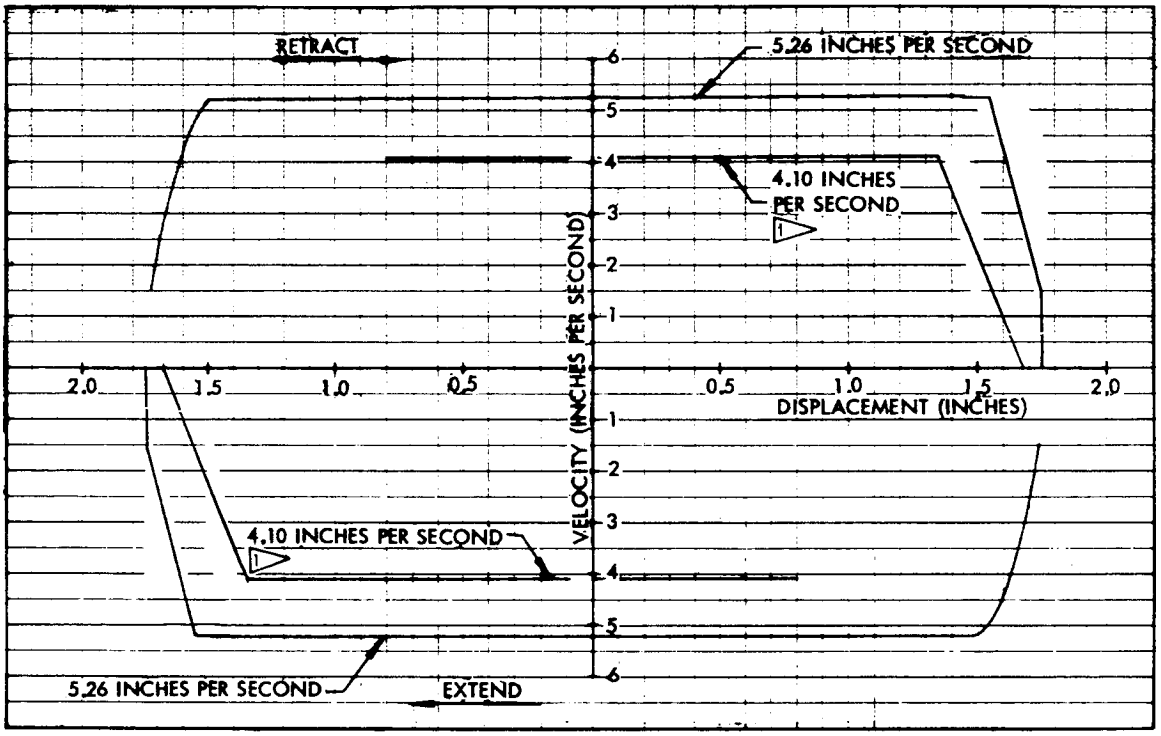
(b) Set test cabinet TS Switch to Position 10, Signal Mode Switch to EXT SIG, TI/TO toggle to DOWN, and X-Y Selector to Position 1. Set X-Y plotter as in step (1)(b).

(c) Connect the surface position transducer to record piston velocity versus piston position.

(d) Open return port and apply fluid pressure of 3000 psi to pressure port.

(e) With the cylinder fully retracted, apply a maximum manual extend signal to the input point, and record velocity versus piston position on X-Y plotter.

(f) Check that the tracing complies with limits of Fig. 726. Repeat step (e) except check actuator retraction from extend position.



1 UNITS WITH BORES REPAIRED MAXIMUM OF 0.030–INCH OVERSIZE ARE ACCEPTABLE WITH MINIMUM VELOCITY OF 3.70 INCHES PER SECOND

Velocity Versus Displacement Curve
Figure 726

R. (For 65-44761-8, -9, -14, -17, -20) Measure Electrical Threshold

(1) Perform test with end of manifold fixed and the electric test cabinet ON. Set test cabinet TS switch to position 10, signal mode switch to MANUAL, TI/TO toggle DOWN, and X-Y Selector to Position 5. Connect position transducer to monitor piston movement relative to manifold.

(2) Apply 3000-psi fluid pressure at pressure port with return port open.

(3) With the input arm free-moving and the electrical system turned ON, nulled, and connected through a suitable amplifier, apply a sinusoidal input of 1/3 Hz to electrohydraulic servo (transfer) valve.

(4) Gradually increase amplitude of signal until piston rod moves. This value is the electrical threshold, and will depend on wiring connections to transfer valve. Record valves in millivolts (or milliamps) and check they do not exceed:

(a) 200 mv or 0.10 ma for electrohydraulic (transfer) valve wired in series.

(b) 100 mv or 0.10 ma in each coil for electrohydraulic (transfer) valve wired in parallel.

(c) 200 mv or 0.20 ma in one coil and differential of 0.20 ma max. for electrohydraulic (transfer) valve wired differentially.

S. Perform Manual Threshold and Hysteresis Test

(1) Perform test with the end of the piston rod fixed and the electric test cabinet OFF. Install dial indicators to monitor input arm travel relative to the fixture and piston rod travel relative to manifold.

(2) Apply 3000-psi fluid pressure at the pressure port and open the return port.

(3) With actuator at null, near mid-travel position, set micrometer at input arm to a mid-point reference value (note reading used) and dial indicator at actuator end fitting to zero (Fig. 727, 728).

(4) Gradually move the input arm in either direction. When movement of the actuator occurs, hold input lever position. Make sure input arm movement does not continue past the point where initial actuator movement begins. Measure and note input arm travel in inches. This is the manual threshold, and should not exceed 0.006 inch.

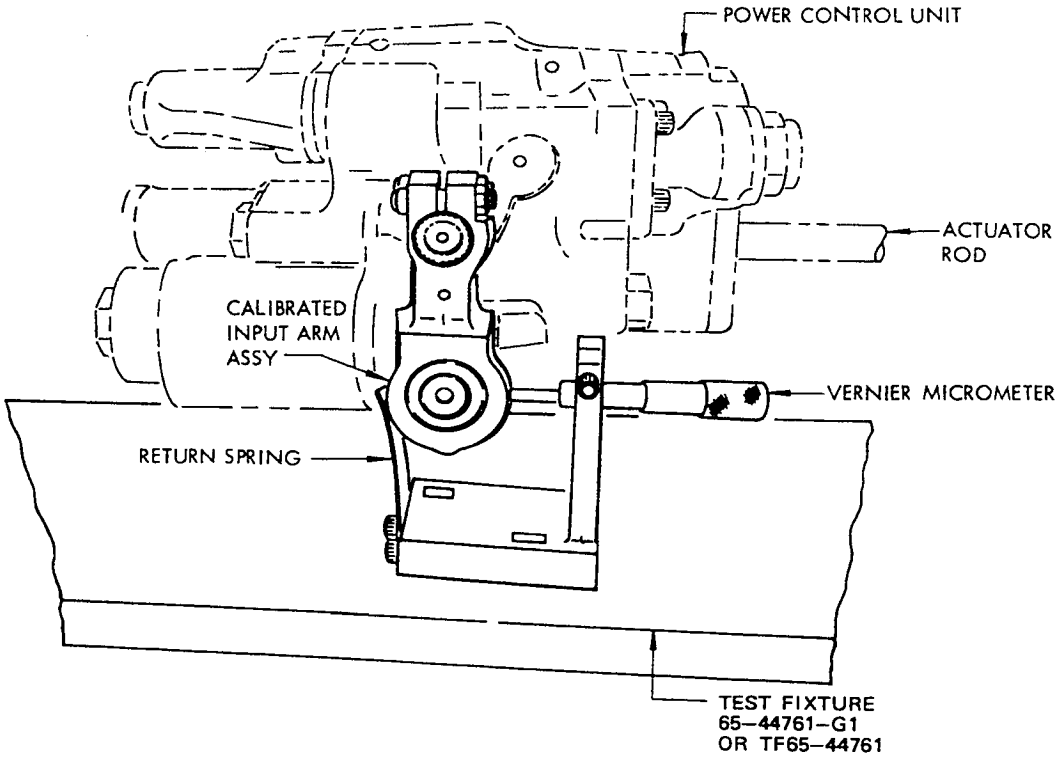
(5) Return the input arm to the initial reference position at the noted reference reading on the micrometer. Do not reset the dial indicator which measures actuator movement.

(6) Repeat step (4), moving input arm in opposite direction. Manual threshold should not exceed 0.006 inch.

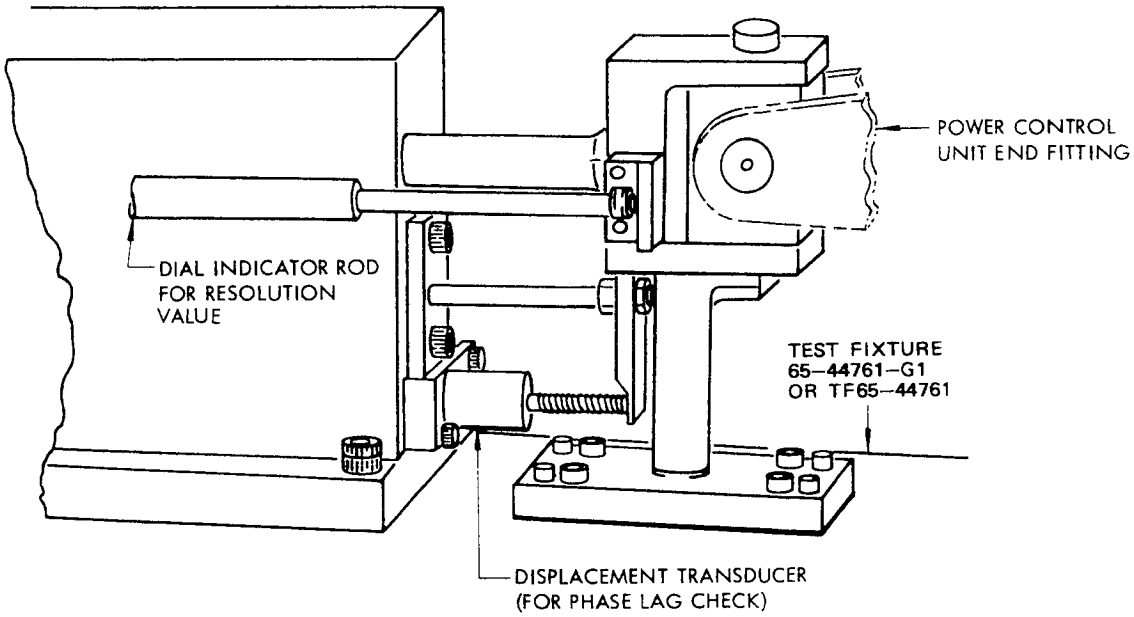
NOTE: Input arm motion exceeding 0.006 inch may be allowed in either direction provided the total deadband does not exceed 0.012 inch.

(7) Return input arm to the initial reference position at the noted reference reading on micrometer.

(8) Record dial indicator reading at the actuator end fitting. This value is the manual hysteresis (resolution) and must not exceed 0.002 inch.



Manual Threshold Test Setup
Figure 727



Manual Hysteresis (Resolution) and Phase Lag Test Setup
Figure 728

T. (For 65-44761-8, -9, -14, -17, -20) Perform Phase Lag Test

(1) Perform test with piston rod end fixed and electric test cabinet ON. Install displacement transducer in base of head end block on test fixture, as shown in Fig. 728.

(2) Set test cabinet TS switch to Position 10; Signal Mode Switch to EXT SIG; TI/TO toggle to DOWN; and X-Y Selector to Position 2.

(3) X-Y Plotter Settings:

(a) X-Axis -Output EXT. Mod 10-5 Var

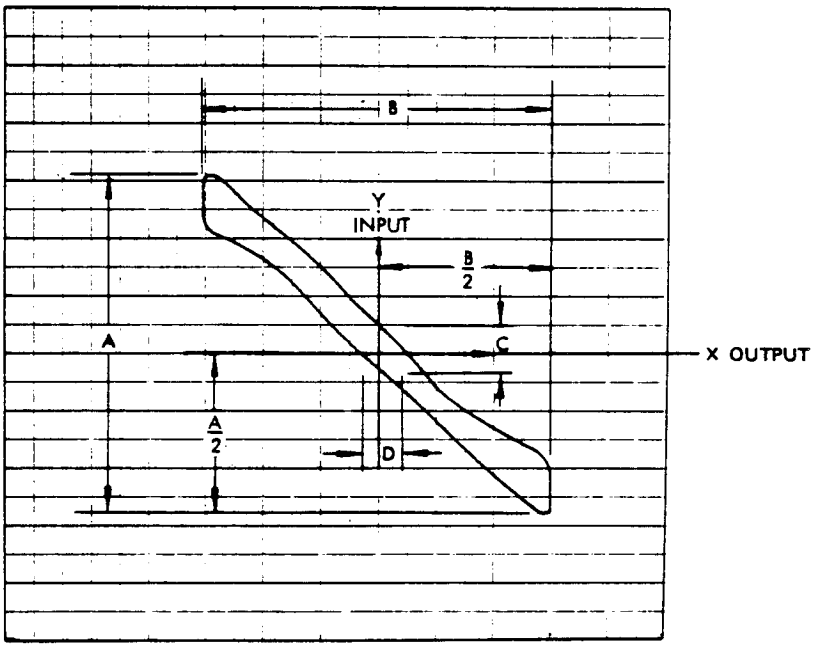
(b) Y-Axis-Input 102-2 Var

(4) Apply fluid pressure of 3000 psi at pressure port with the return port open.

(5) With the electrical system ON, nulled, and connected through an amplifier, apply a sinusoidal input of 1/3 Hz to electrohydraulic (transfer) valve of sufficient amplitude to provide a peak-to-peak displacement of the piston rod 0.0143-0.0163 inch.

(6) Plot a continuous tracing of input vs. output.

(7) Measure and record phase shift between the input and output by analyzing the tracing per Fig. 729. The phase shift shall not exceed 17 degrees.



PHASE ANGLE COMPUTATION

$$\text{SIN } \emptyset = \frac{\left(\frac{C}{A} + \frac{D}{B}\right)}{2} \leq \text{SIN } 17^{\circ} = 0.292$$

WHERE:
A = MEASURED VERTICAL HEIGHT OF LOOP
B = MEASURED HORIZONTAL LENGTH OF LOOP
C = MEASURED VERTICAL WIDTH OF LOOP ALONG B/2 POINT

D = MEASURED HORIZONTAL WIDTH OF LOOP ALONG A/2 POINT

$\emptyset$ = PHASE ANGLE IN DEGREES (17° MAX)

Phase Shift Curve on X-Y Plotter
Figure 729

U. Perform Internal Leakage Test, Including Cylinder Interconnect Bleed, Test with Actuator at Extreme Position

(1) Perform test with manifold end retained in test fixture and test cabinet turned OFF.

(2) With return port open, apply fluid pressure of 3000 psi to pressure port.

(3) Using input arm, fully extend actuator and hold arm against manifold stops. Check that leakage at return port does not exceed 1000 cc per minute.

(4) Repeat step (3) except actuator in fully retracted position.

V. DELETED

13. In-Service Test Limits (Applies to all assemblies unless otherwise noted)

NOTE: The following test limits are the minimum standard for determining if a unit in service may be continued in use without overhaul. Overhauled units must be tested per par. 1 thru 12.

A. The in-service test limits shall be identical to the new or overhauled unit test limits except as indicated in the following paragraphs.

B. Shutoff Valve Assembly (65-35662-1, -2) Pretest (For 65-44761-8, -9, -10, -14, -17, -20). Perform test per par. 7, except as follows:

(1) In par. 7.C.(2) and 7.C.(4), a flow rate of 525-725 cc per minute is acceptable.

C. Servo Valve Assembly Pretest. Perform tests per par. 10, except as follows:

(1) Omit par. 10.B. (proof pressure test).

(2) In par. 10.C.(5) check that reading of cylinder pressures is 300-2700 psi and null leakage from return port is 50-2000 cc per minute.

(3) In par. 10.D.(4), check that interconnect pressure is 300-2700 psi throughout entire stroke, and that pressure does not vary more than ± 300 psi from null pressure measured in step (2) preceding.

(4) In par. 10.G.(10) check that valve displacement from C2-C1 equal to 500 psi, or C1-C2 equal to 500 psi, does not exceed 0.0016 inch.

D. Manifold Assembly Pretest. Perform tests per par. 11, except as follows:

(1) In par. 11.A.(5), (6), a constant flow of 525-725 cc per minute is acceptable.

(2) In par. 11.C.(3), a minimum resistance of 10 megohms is acceptable.

E. Power Control Unit Assembly Test. Perform tests per par. 12, except as follows:

(1) Omit par. 12.D. (proof pressure test).

(2) In par. 12.I.(3), a maximum leakage of one drop per 5 full cycles and a maximum input shaft seal external leakage of one drop per 25 cycles is acceptable.

(3) (For 65-44761-8, -9, -14, -17, -20) In place of the internal leakage tests of par. 12.K and 12.M, perform the following steps:

NOTE: Refer to step (g) for alternate procedure to steps (a) thru (f).

(a) Perform test with manifold end fixed in test fixture, electrical test cabinet initially turned OFF and return port open. With input crank neutrally positioned between stops, apply fluid pressure of 3000 psi to pressure port.

(b) Using input arm, operate unit to any intermediate actuator position and permit unit to stop (null) at this position. Check that leakage at return port does not exceed 3000 cc per minute. Measure and note leakage value.

(c) Switch electrical test cabinet to ON. Set test cabinet TS switch to position 2, Signal Mode switch to MANUAL, TI/TO toggle to DOWN and X-Y Selector to Position 1.

(d) Repeat step (b) preceding except operate unit electrically. A maximum flow of 2000 cc per minute above flow measured in step (b) preceding is acceptable. Measure and note leakage value.

(e) Operate unit electrically to any intermediate actuator position outside snubbing range and permit unit to stop (null) at this position. Using input arm, manually override autopilot input. Hold input arm in hardover position. Measure and note leakage at return port for 1 minute.

(f) Add leakage noted in steps (b), and (e) and from total subtract leakage from step (d). Resultant leakage (primarily piston seal leakage) shall not exceed 200 cc per minute.

NOTE: In place of steps (a) thru (f) the following method may be used:

(g) Remove servo valve (11, Fig. 1101) from assembly and install a plate to seal off opening manifold. Fix one end of assembly. Energize solenoid valve. Using input arm, manually override autopilot and hold input arm in hardover position. Resultant leakage (primarily piston seal leakage) must not exceed 200 cc per minute.

(4) (For 65-44761-10, -12, -15, -16, -18, -19, -21, -22) In par. 12.L.(3) a maximum flow of 3000 cc per minute is acceptable.

(5) (For 65-44761-8, -9, -14, -17, -20) In place of the electrical servo null test of par. 12.M, perform the following steps:

(a) Remove servo valve (11, Fig. 1101) and check that it complies with manufacturer's in-service test limits. Reinstall either existing or replacement valve in the unit.

(b) Fix manifold end in test fixture, and turn electrical test cabinet ON.

(c) Set test cabinet TS switch to position 2, Signal Mode switch to MANUAL, TI/TO toggle to DOWN and X-Y Selector to position 1.

(d) With input arm free, apply 3000 psi fluid pressure to pressure port. Energize hydraulic solenoid valve (7, Fig. 1101), but provide no current to coils of electrohydraulic (transfer) valve (11, Fig. 1101). Check there is no discernable movement of the piston rod.

(e) If piston rod movement is noted in step (d) preceding, gradually increase current to electrohydraulic (transfer) valve (11, Fig. 1101) coils until movement ceases. Check and record that current measured does not exceed 0.30 ma.

(f) If current exceeds 0.30 ma in step (e) preceding, perform following adjustments.

1) Reduce current to electrohydraulic (transfer) valve (11, Fig. 1101) to zero.

2) Remove retainer plug (96, Fig. 1101), using autopilot shaft torque wrench adapter, 65-44761-F20 or AT69-35694.

3) Adjust eccentric shaft (99, Fig. 1101) until piston rod movement ceases and clockwise rotation on autopilot engage cam retracts piston rod.

4) Install retainer plug (96, Fig. 1101) and tighten to 95-105 lb-in. Tightening the plug may alter adjustment; therefore repeat preceding steps until limit of step (e) preceding is met.

(6) Omit par. 12.Q. snubbing test.

(7) In par. 12.T.(7), a maximum phase shift angle of 20 degrees is acceptable.

(8) In par. 12.U.(3) and (4), a maximum leakage of 1500 cc per minute is acceptable.

F. (For 65-44761-8, -9, -14, -17, -20), a unit used as an elevator or aileron PCU may have been removed from service for stabilizer out-of-trim light nuisance illumination or related aileron/autopilot malfunction. Perform Method 1 or Method 2 actuator force output with autopilot input test as follows to confirm and isolate fault.

(1) Method 1.

(a) Remove and replace bypass valve (126, Fig. 1101) with test manifold, F80170-1. Install 0-5000 psi pressure gage in both ports of test manifold (Fig. 712A).

(b) Install actuator in test fixture, TF65-44761, with manifold end fixed and actuator extended near mid stroke, out of snubbing range.

(c) With input arm free, electrical test cabinet turned ON, apply 3000 psi fluid pressure to pressure port. Set test cabinet TS switch to position 4, Signal Mode Switch to MANUAL, TI/TO toggle to DOWN and X-Y Selector Switch to position 1.

(d) Gradually rotate test cabinet MANUAL control knob to increase dc input current through electrohydraulic (transfer) valve (11, Fig. 1101) to 2.0 MA to pressurize actuator in extend direction. Check that difference of pressure readings on gages is not less than 1400 psi.

(e) Repeat step (d) except pressurize unit in retract direction.

(2) Method 2.

(a) Install actuator in test fixture as required to react its output with a load actuator.

(b) With input arm free, electrical test cabinet turned on, apply 3000 psi fluid pressure to pressure port. Set test cabinet TS switch to position 4, Signal Mode Switch to MANUAL, TI/TO toggle to DOWN and X-Y Selector Switch to position 1.

(c) Gradually rotate test cabinet MANUAL control knob to increase dc input current through electrohydraulic (transfer) valve (11, Fig. 1101) to 2.0 MA to pressurize actuator (PCU) in extend direction. Maintain PCU actuator in equilibrium with the load actuator holding PCU actuator at mid stroke. Check that compressive load on PCU actuator is not less than 1080 pounds.

(d) Repeat steps (b) and (c) with PCU actuator pressurized in the retract position. Check that tension load on PCU actuator is not less than 1080 pounds.

(3) If limit requirements of steps (1) or (2) cannot be met, perform test per par. 13.E.(5) and repeat steps (1) or (2).

TROUBLE SHOOTING

1. Trouble during test after overhaul of Aileron, Elevator Power Control Unit Assembly. (See figure 1101) or as noted.

	Trouble	Possible Cause	Correction
A.	Electrical malfunction (65-44761-8, -9, -14, -17 -20)	Moisture accumulated in receptacle assembly	Examine and correct as necessary
		High resistance connections, low dielectric strength, wrong connections	Refer to End Fitting Assembly (56), in paragraph 4
			Refer to manifold assembly (140), in paragraph (6)
			Test electrohydraulic servo valve (11) in accordance with manufacturers overhaul procedure and replace valve if necessary
			Test linear transducer (52) in accordance with TESTING paragraph 9 and replace transducer (52) if necessary
B.	Excessive internal leakage	Damaged seal assembly (81)	Replace seal assembly (81)
		Damaged seal assembly (108)	Replace seal assembly (108)
		Defective servo valve assembly (18)	Refer to servo valve assembly (18) in paragraph 2
		Defective hydraulic solenoid control valve assembly (7)	Refer to hydraulic solenoid control valve (7) in paragraph 5

Trouble	Possible Cause	Correction
B. Excessive internal leakage (Cont)	Defective thermostatic control valve (61) or O-ring packing (63)	Check thermostatic control valve in accordance with TESTING paragraph 8 and adjust or replace as necessary
		Replace O-ring packing (63) and backup rings (62)
	Defective electrohydraulic servo valve (11)	Test valve (11) in accordance with manufacturers overhaul procedures and replace valve as necessary
	Slide (127) and sleeve (128) clearances excessive	Check serial numbers on slide (127) and sleeve (128) and ensure proper grouping or replace valve assembly (126)
	Defective O-ring packing (125)	Replace O-ring packing (125)
	Slide (138) and sleeve (139) clearances excessive	Check serial numbers on slide (138) and sleeve (139) and ensure proper grouping or replace valve assembly (137)
	Defective O-ring packing (136)	Replace O-ring packing (136) and backup rings (135)
C. External leakage	Damaged O-ring packing or seal assembly	Trace source of leak and correct as applicable
		Refer to input shaft assembly (34) in paragraph 3
D. Improper neutral rig	Improper setting of eccentric shaft (99)	Adjust eccentric shaft in accordance with TESTING, paragraph 12.K.
E. Excessive input friction	Components of input shaft assembly (34) binding	Refer to input shaft assembly (34) in paragraph 3

	Trouble	Possible Cause	Correction
E.	Excessive input friction (Cont)	Components of input arm assembly (21) binding	Repair or replace components of input arm assembly (21) as necessary
		Foreign material in servo valve assembly (18)	Refer to servo valve assembly (18) in paragraph 2
F.	Excessive mechanical hysteresis	Excessive play between input shaft assembly (34) driving balls and slides (11 and 12)	Check dimensions of parts and repair or replace input shaft assembly (34) or servo valve assembly (18) as required
G.	Excessive phase lag	Defective electrohydraulic servo valve assembly (11)	Test valve assembly (11) in accordance with manufacturers overhaul procedure and replace valve assembly if necessary
H.	Improper snubbing action	Damaged cavity in bearing (80 or 93)	Replace bearing (80 or 93)

2. Trouble during test after overhaul for Servo Valve Assembly. (See figure 1102.)

	Trouble	Possible Cause	Correction
A.	External leakage	Damaged O-ring packing (4)	Replace O-ring packing (4)
B.	Neutral pressure or flow, lap leakage, pressure gain, pressure balance, phasing or friction malfunction	Slides (11 and 12) and sleeve (14) clearances or operation defective	Check slides (11 and 12) and sleeve (14) for proper serial number and operation. Refer to INSPECTION/CHECK, paragraph 3
		Damaged or worn slide assembly (10)	Replace slide assembly (10)
		Foreign material in slide assembly (10)	Clean slide (11 and 12) and housing sleeve assembly (13) as necessary

3. Trouble during test after overhaul for Input Shaft Assembly (Fig. 1103).

	Trouble	Possible Cause	Correction
A.	Shaft (2) binding in bearings	Shaft (2) bent	Replace input shaft assembly
B.	Excessive override torque	Bearing (5) binding	Replace bearing (5)
C.	Hydraulic fluid leakage between shaft (2) and shaft (6)	Defective O-ring packing (27, Fig. 1101)	Replace O-ring packing (27, Fig. 1101)

4. (For 65-44761-8, -9, -14, -17, -20) Trouble during test after overhaul for End Fitting Assembly (Fig. 1104).

	Trouble	Possible Cause	Correction
A.	High resistance connections	Defective crimp connections between wires (6, 7, 8 or 9) and pins of plug assembly (4)	Repair connections as required
		Defective solder connections at pins of receptacle assembly (2)	Check for correct soldering and repair as necessary
B.	Low dielectric strength	Defective tubing (5) or crimping of pins on plug assembly (4)	Replace tubing (5) and repair crimping as necessary
C.	Wrong electrical connections	Wires (6, 7, 8 or 9) connected to wrong pins on plug assembly (4) or receptacle assembly (2)	Correct wiring. Refer to REPAIR, Fig. 406

5. For trouble during test after overhaul for the Hydraulic Solenoid Control Valve (7, Fig. 1101), refer to the manufacturer's overhaul manual.

6. Trouble during test after overhaul of Manifold Assembly (Fig. 1106).

	Trouble	Possible Cause	Correction
A.	High resistance connections (65-44761-8, -9, -14, -17, -20)	Defective crimp connections between wires (6, 7, 8, 9, 13, 14, 15, 16, 20, 21, 22, 23, 27, 28) and plug assemblies (3, 10, 17, 24) or receptacle assembly (30)	Repair connection as required

	Trouble	Possible Cause	Correction
B.	Low dielectric strength (65-44761-8, -9, -14, -17, -20)	Defective tubing (5, 12, 19, or 26) or improper crimping of pins of plug assemblies (3, 10, 17, 24) or receptacle assembly (30)	Replace tubing (5, 12, 19 or 26) and repair crimping as necessary
C.	Wrong electrical connections (65-44761-8, -9, -14, -17, -20)	Wires (6, 7, 8, 9, 13, 14, 15, 16, 20, 21, 22, 23, 27, or 28) connected to wrong pins on plug assemblies (3, 10, 17 or 24) or receptacle assembly (30)	Correct wiring in accordance with REPAIR, Fig. 406
D.	Leakage at passage sealing plugs (65-44761-8, -9, -14, -17, -20)	Loose pins (31) and plugs (32)	Replace leaking plugs (32) and pins (31)

STORAGE INSTRUCTIONS

1. After tests have been completed prepare unit for storage

   A. Partially fill power control unit with hydraulic fluid BMS 3-11.

   B. Ensure that receptacle assembly (30, Fig. 1106) is covered with cap (1, Fig. 1101) (65-44761-8, -9, -14, -17, -20) and pressure and return ports are closed with plugs (2, 3, Fig. 1101).

   C. Tag or mark with test date.

   D. Place unit in a heavy gage plastic bag.

   E. If stored for a long period of time, place packaged unit in a cushioned container or wooden box.

   F. Seal container and mark with assembly part number, serial number, and test date on container exterior; include cure date for seals.

   G. For further information, refer to 20-44-02, for temporary protective coatings, and to 20-70-01, for protection, storage, and handling of airplane components.

SPECIAL TOOLS, FIXTURES AND EQUIPMENT

1. General

A. Equivalents may be used for tools, fixtures and equipment listed in this section.

B. Aileron and Elevator Power Control Unit Assembly (See figure 1101.)

	Part Number	Nomenclature	Use
(1)	AT83333 *[1]	Seal Insertion Tool	Installing channel seal in manifold
(2)	AT69-35663-1001 *[1] 65-44761-F16 *[2]	Input Cavity Plug Torque Wrench Adapter	Removing and installing input cavity plug
(3)	AT65-44835 *[1] 65-44761-F12 *[2]	Bearing Assembly Fixture	Installing bearings for input shaft assembly
(4)	AT66-22805 *[1] 65-44836-T1 *[2]	Pressing Tool	Installing bushing for eccentric shaft
(5)	AT65-44834 *[1] 65-44761-F14-2 *[2]	Torque Wrench Adapter	Tightening rod end assembly on piston rod
(6)	AT69-35669-1 *[1] 65-44761-F13 *[2]	Autopilot Engage Spring Guide Wrench	Adjusting autopilot engage spring during assembly and testing
(7)	AT69-35694 *[1] 65-44761-F20 *[2]	Torque Wrench Adapter	Tightening eccentric shaft plug during test adjustment
(8)	TF65-44761 *[1] 65-44761-G1 *[2]	Test Fixture	Supports power control unit during tests
(9)	Deleted		

Part Number		Nomenclature	Use
(10)	Deleted		
(11)	TF94900-1009 or -1001 *[1]	Electric test cabinet control package. For use with 110-volt, 60-Hz single phase electric power	Provides electrical controls and instrumentation for testing
(12)	TF94900-1011 or -1003 *[1]	Electric test cabinet control package. For use with 220-volt, 50-Hz single phase electric power	Provides electrical controls and instrumentation for testing
(13)	TF94991-121 *[1] 65-44761-F8 *[2]	Patch Plug	Adapts test cabinet for use with power control unit
(14)	TF94988-101 *[1]	Cable Assembly	Connects electrical test cabinet to actuator
(15)	TF94939-101 *[1]	Cable Assembly	Connects electrical test cabinet to test fixture
(16)	TF69-35666 *[1] 65-44761-F17 *[2]	Master Input Arm Assembly	Installing and calibrating input arm assembly
(17)	MF165-44761 *[1] MF265-44761 *[1] 65-44761-F19 *[2]	Machining Fixture	Machining input arm assembly stop clearances
(18)	125 pounds capacity ± 1% accuracy	Force Transducer	Measures input arm override control force during testing
(19)	Model 260 *[4]	Multimeter	Measures electrical resistance and voltages during repair and testing

	Part Number	Nomenclature	Use
(20)	Model 400D *[5]	VTVM (vacuum-tube voltmeter)	Measures electrical signal voltages during testing
(21)	Model 404 *[6]	Hypot (Hight potential tester)	Applying high voltage for dielectric strength tests
(22)	Model HP7090A *[5]	X-Y Recorder	Plots performance characteristics of power control unit and components during testing
(22A)	Model 925E or 1100 *[15]	X-Y Recorder	Alternate to item 22
(23)	Deleted		
(24)	Model 412A *[5]	Megger Test Set	Measures insulation resistance during repair and testing
(25)	TF59197-105 *[1]	Test Fixture Assembly	Provides support and connection for air leakage test of the 1-gallon per minute filter element
(26)	TF59197-107 *[1]	Test Fixture Assembly	Provides support and connection for air leakage test of the 6-gallon per minute filter element

	Part Number	Nomenclature	Use
(27)	TF66-22801 *[1] 65-44761-F3 *[2]	Test Fixture Manifold Assembly	Supports and connects bypass valve for delivery of hydraulic pressure and flow during testing
(28)	TF59830-1001 *[1]	Manifold Assembly, thermostatic valve	Supports and connects valve for delivery of hydraulic pressure and flow during testing
(29)	8692 *[7]	Temperature Potentiometer	Measures fluid temperature for thermostatic valve test
(30)	TF69-35662 *[1] 65-44761-F4 *[2]	Test Fixture Manifold Assembly	Supports shutoff valve for delivery of hydraulic pressure and flow during testing
(31)	Capable of measuring from 0.5 to 60 pounds at ± 5% accuracy	Spring Scale	Measures breakaway running forces for actuator cylinder friction test
(32)	F80170-1	Test manifold	Replaces bypass valve during actuator force output/autopilot input test
(33)	65-44761-F21 *[2]	Input Arm Pressing Fixture	Installation of bearing (28) to input arm assembly (21)
(34)	65-44834-F6 *[2]	Rod End Assembly Pressing Fixture	Installation of bearing (68) to rod end assembly (69)

C. Test electrohydraulic servo valve assembly (11, Fig. 1101) in accordance with manufacturer's overhaul instructions. The following equipment may also be utilized.

NOTE: Items in paragraph B.(18) and (19) are also used for testing this part.

	Part Number	Nomenclature	Use
(1)	TF59106 *[1] 65-44761-F5 *[2]	Test Block	Supports and connects valve for delivery of hydraulic pressure, flow, and electrical signals during testing
(2)	TF61626-5005 *[1]	Hydraulic and Electrical console	Provides support, power connection and instrumentation for testing valve

	Part Number	Nomenclature	Use
(3)	Model 202A *[5]	Function Generator	Supplies a shaped input signal for actuating and testing valve
(5)	Capability of supplying 0 to 8 volts dc	Power Supply	Supplies actuating signal voltage for testing valve

D. Linear Position Transducer (52, Fig. 1101)

NOTE: Items in paragraph B.(15), (16) and (17) are also used to test this part.

	Part Number	Nomenclature	Use
(1)	Model 130A *[5]	Oscilloscope	Checks phase relations during testing
(2)	N1-3 *[8]	Null Indicator	Checks null position during testing
(3)	RT-60 *[8]	Ratio Transformer	Determines transducer voltage gain during testing
(4)	200CD *[5]	Signal Generator	Provides input voltage at required frequency during testing
(5)	MC30 *[9]	Amplifier	Amplifies input to proper voltage for testing

E. Servo Valve Assembly (Fig. 1102)

NOTE: Item (5) is same as items (1) (3) (4) combined. Item in Par. B. (31) is also used to test this part.

	Part Number	Nomenclature	Use
(1)	65-44828-F2 *[2]	Servo Valve Torque Wrench Adapter	Aids in removal and installation of nut (1)
(2)	Deleted		
(3)	65-44671-G2 *[2]	Test Fixture	Supports servo valve and provides means of supplying pressure during testing
(4)	65-44761-F4 *[2]	Test Fixture	Supports and connects valve assembly during proof pressure testing
(5)	TF65-44828 *[1]	Test Fixture	(See NOTE preceding)
(6)	Model 2DR-4 *[10]	X-Y Recorder	Plots performance characteristics of servo valve assembly during testing
(7)	Model 221 *[11]	Valve Flow Analyzer Panel	For testing servo valve assembly
(8)	Model 806 *[11]	Pressure Control Unit	Controls pressure to valve for plotting of curves during testing
(9)	65-44828-F3A *[2]	Torque Fixture	Supports servo valve assembly to disassemble nut (1) and extract retainer (2) and spring (5)
(10)	65-44671-F7 *[2]	Assembly Tool	Aids in removal and installation of seat (9)

F. Input Shaft Assembly (Fig. 1103)

	Part Number	Nomenclature	Use
(1)	69-35665-F1 *[2]	Assembly Fixture	Installation of bearing (5) or spacer and ball (4)

G. End Fitting Assembly (Fig. 1104)

	Part Number	Nomenclature	Use
(1)	69-35660-F1 *[2]	Arbor Press Fixture	Aids in removal and installation of bushings (10)
	(For 69-35660-1 only) Replacement of Electrical components		
(2)	000407-0001 *[12]	Contact Crimp Tool	Crimp new wires to plug contacts
(3)	000407-0002 *[12]	Contact Crimp Gage	To check size of crimped contact
(4)	000407-0003 *[12]	Contact Insertion Tool	To insert contacts into plug assembly
(5)	000407-0004 *[12]	Contact Extraction Tool	Removal of contacts from plug assembly

H. Manifold Assembly (Fig. 1106)

	Part Number	Nomenclature	Use
	(For 65-44836-1, -17, -19 only) Replacement of Electrical components		
(1)	000407-0001 *[12]	Contact Crimp Tool	Crimp new wires to plug contacts
(2)	000407-0002 *[12]	Contact Crimp Gage	To check size of crimped contact
(3)	000407-0003 *[12]	Contact Insertion Tool	To insert contacts into plug
(4)	000407-0004 *[12]	Contact Extraction Tool	Removal of contacts from plug assembly
(5)	294-88 *[13] DAK20 *[14]	Contact Insertion Tool	To insert contacts into receptacle
(6)	294-89 *[13] DRK20 *[14]	Contact Removal Tool	Removal of contacts from receptacle assembly
(7)	294-90 *[13] TR1A *[14]	Contact Crimp Tool	Crimp new wires to receptacle contacts

I. Manifold Assembly (Fig. 1106A)

	Part Number	Nomenclature	Use
(1)	CUTA1870104C *[3]	Resistor Installation/Extraction Tool	Install and extract Resistor (20)

J. Supplier

*[1] PARKER HANNIFIN CORP., DIV. AEROSPACE GROUP HEADQUARTERS
14300 ALTON PARKWAY
IRVINE, CALIFORNIA 92618-1898
VENDOR CODE: V92003

*[2] PARKER HANNIFIN CORP., DBA HYDRAULIC SYSTEMS DIV.,
2220 PALMER AVE.,
KALAMAZOO, MICHIGAN 49001-4165
VENDOR CODE: V93835
FORMERLY V21804

*[3] THE LEE COMPANY
2 PETTIPAUG RD
WESTBROOK, CONNECTICUT 06498-1591
VENDOR CODE: V92555

*[4] SIMPSON ELECTRIC COMPANY
520 SIMPSON AVE
LAC DU FLAMBEAU, WISCONSIN 54538 -0099
VENDOR CODE: V55026

*[5] HEWLETT-PACKARD CO VIDEO COMMUNICATION DIV
5301 STEVENS CREEK BLVD
SANTA CLARA, CALIFORNIA 95052
VENDOR CODE: V50436
FORMERLY IN PALO ALTO, CALIFORNIA

*[6] ASSOCIATED RESEARCH INCORPORATED
13860 W LAUREL DR
LAKE FOREST, ILLINOIS 60045-4531
VENDOR CODE: V04237
FORMERLY IN LAKE BLUFF, ILLINOIS

*[7] LEEDS AND NORTHRUP CO A UNIT OF GENERAL SIGNAL CORP
11822 NORTH CREEK PKY N
BOTHELL, WASHINGTON 98011
VENDOR CODE: V5E737

*[8] Replaced: [V56872] SEE V81118 EATON CORPORATION
By Code: Name and Address below
81118: EATON CORPORATION
EATON CENTER, 1111 SUPERIOR AVENUE
CLEVELAND, OHIO 44114-9696

*[9] MCINTOSH LABORATORY INC
2 CHAMBERS
BINGHAMTON, NEW YORK 13903
VENDOR CODE: V90439

*[10] HEWLETT-PACKARD CO SAN DIEGO DIV
16399 W BERNARDO DR.
SAN DIEGO, CALIFORNIA 92127-1801
VENDOR CODE: V28480

*[11] AAI/ACL TECHNOLOGIES INC IM AND C DIV
3200 ENTERPRISE ST.
BREA, CALIFORNIA 92821-6289
VENDOR CODE: V03864
FORMERLY IN SANTA ANA, CALIFORNIA

*[12] VIKING ELECTRONICS, INC.
5455 ENDEAVOUR CT.
MOORPARK, CALIFORNIA 93021-1712
VENDOR CODE: V05574

*[13] AMPHENOL CORPORATION
40-60 DELAWARE AVE.
SIDNEY, NEW YORK 13838-1395
VENDOR CODE: V02660

*[14] DANIELS MANUFACTURING CORPORATION
526 THORPE RD.,
ORLANDO, FLORIDA 32824-8133
VENDOR CODE: V11851

*[15] ALLEN DATAGRAPH, INC.
2 INDUSTRIAL WAY
SALEM, NEW HAMPSHIRE 37079-2837

BOEING COMMERCIAL JET

OVERHAUL MANUAL

ILLUSTRATED PARTS LIST

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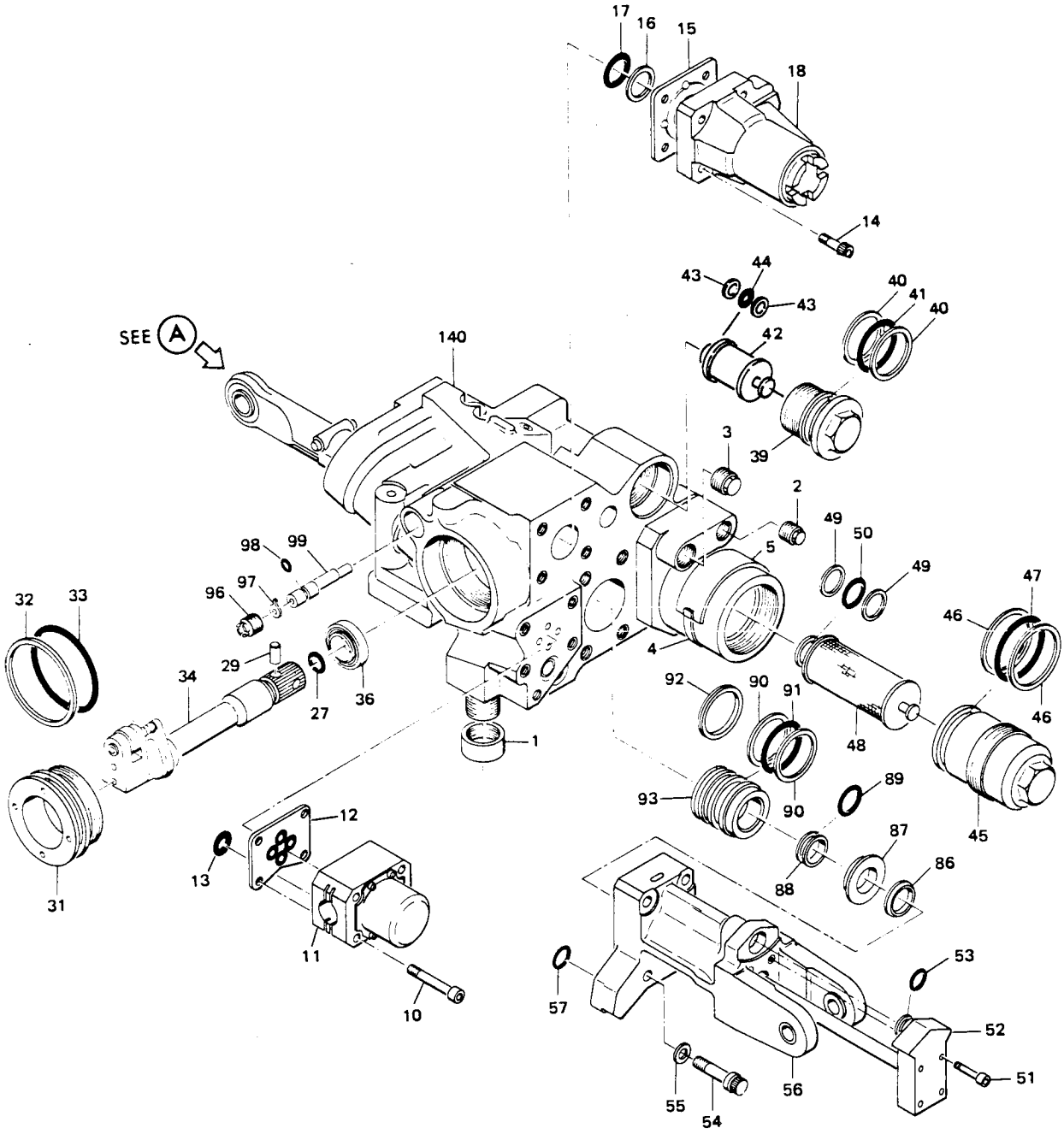
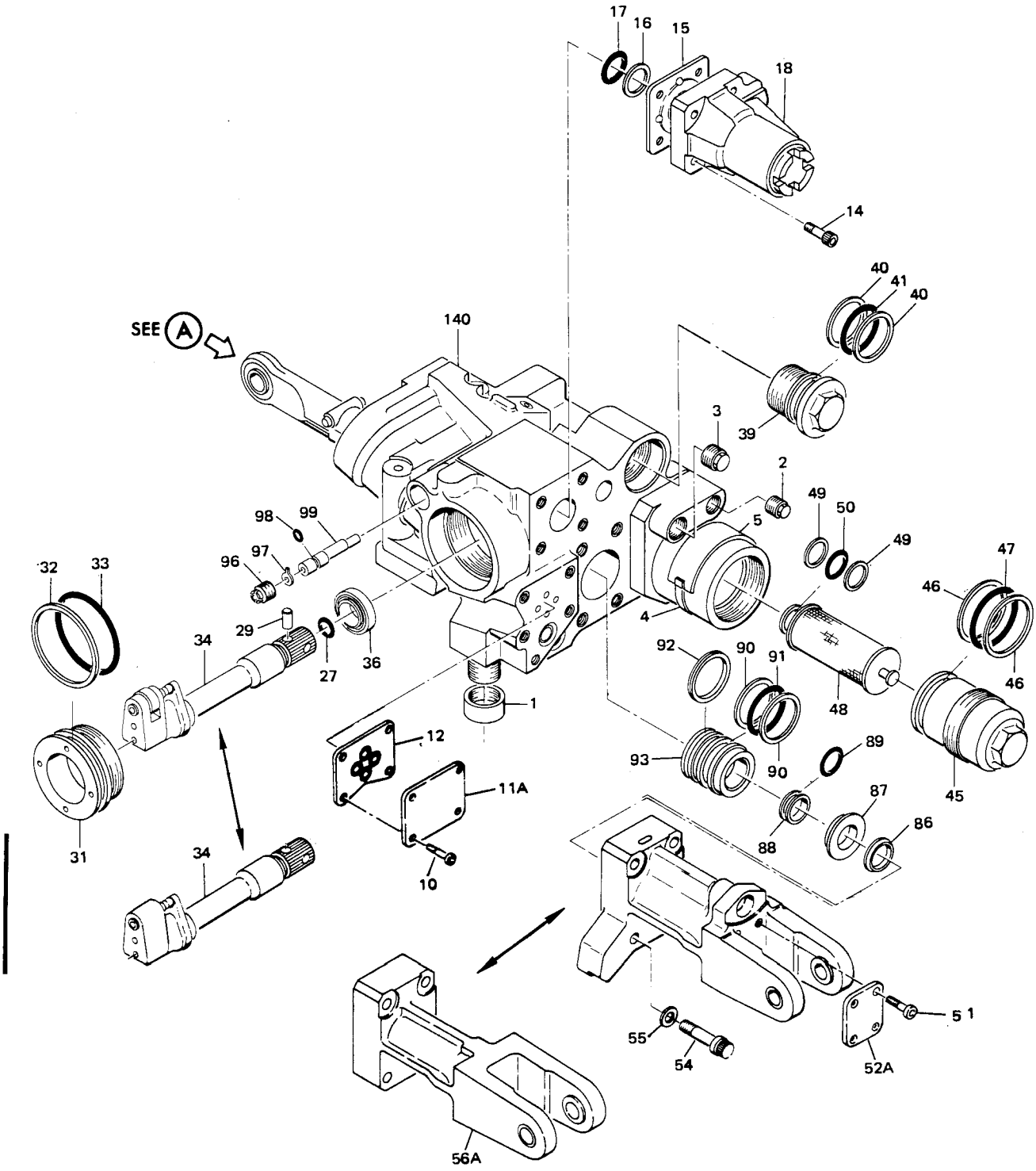


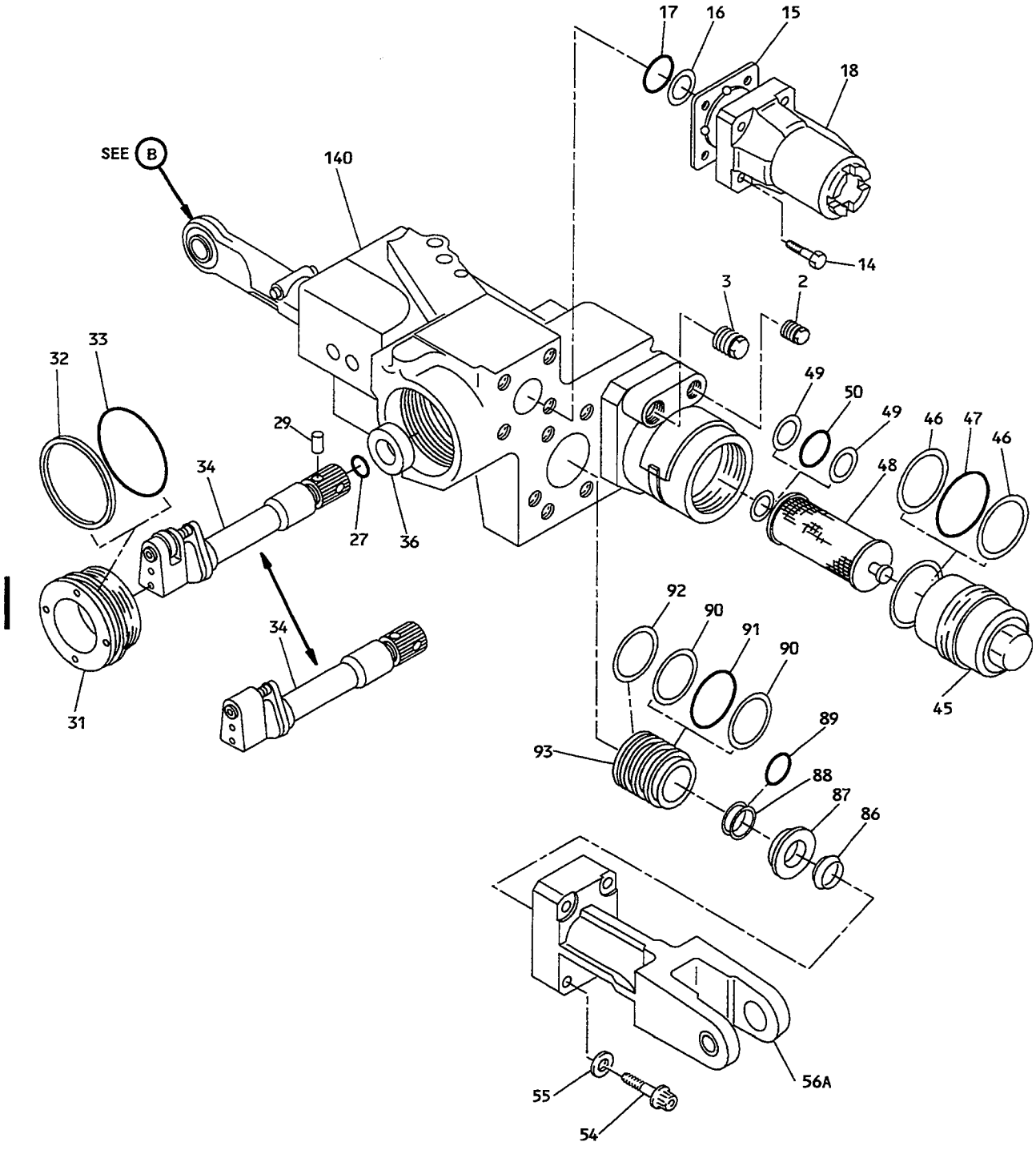
65–44761–8, –9, –14, –17, –20

Aileron and Elevator Power Control Unit Assembly
Figure 1101 (Sheet 1)



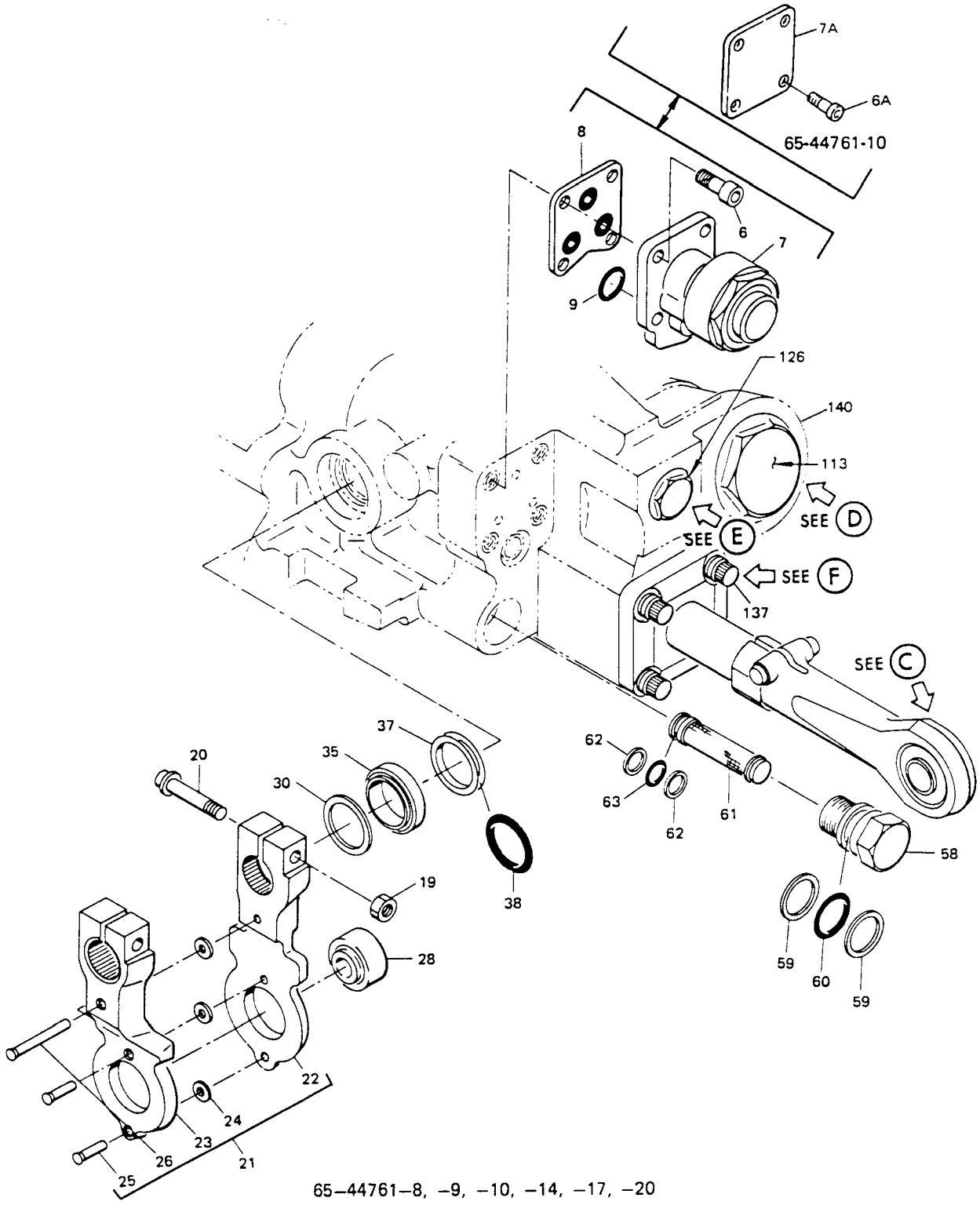
65-44761-10

Aileron and Elevator Power Control Unit Assembly
Figure 1101 (Sheet 2)



65-44761-12,-15,-16,-18,-19,-21,-22

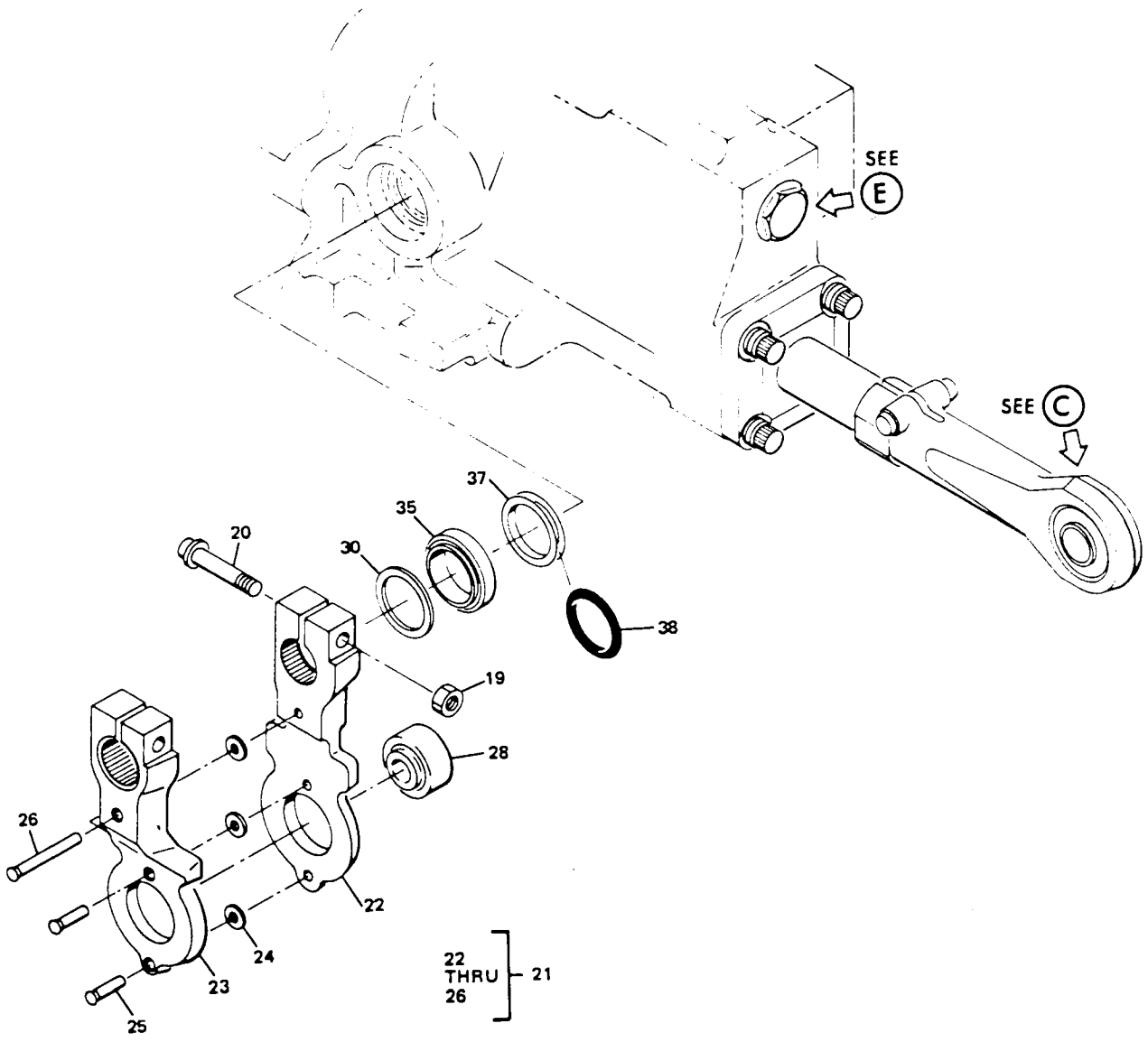
Aileron and Elevator Power Control Unit Assembly
Figure 1101 (Sheet 3)



65-44761-8, -9, -10, -14, -17, -20

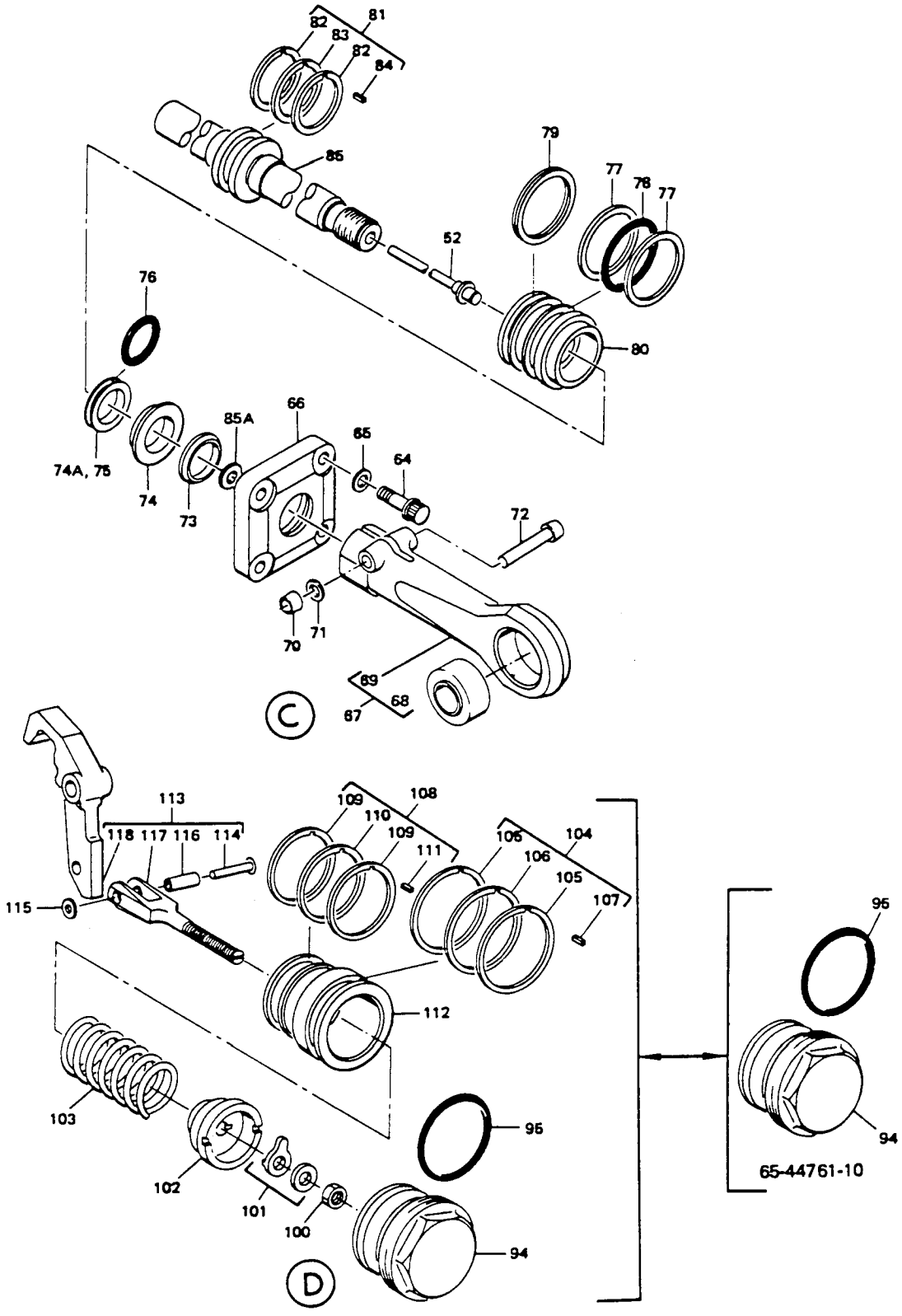
(A)

Aileron and Elevator Power Control Unit Assembly
Figure 1101 (Sheet 4)

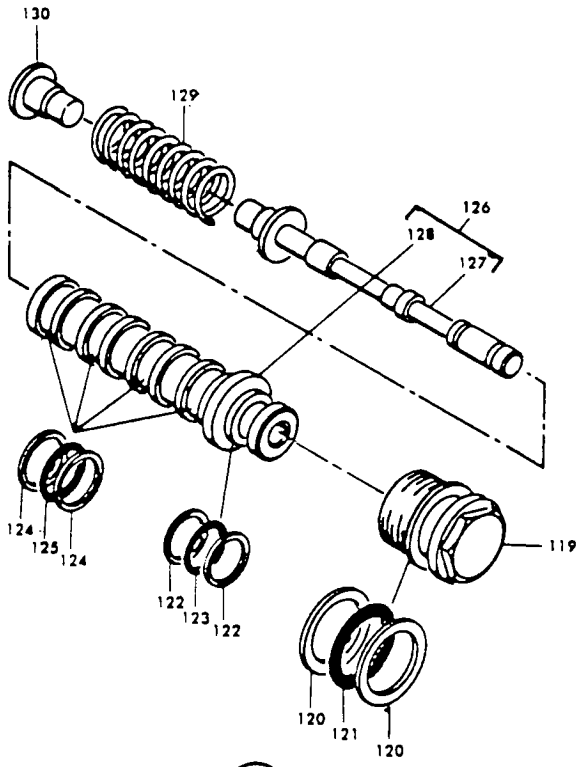


65—44761—12, —15, —16, —18, —19, —21, —22

(B)



Aileron and Elevator Power Control Unit Assembly
Figure 1101 (Sheet 6)



Aileron and Elevator Power Control Unit Assembly
Figure 1101 (Sheet 7)

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
	65-44761-8		UNIT ASSY, AIL/ELEV PWR CONTROL	A	RF
	65-44761-9		UNIT ASSY, AIL/ELEV PWR CONTROL	B	RF
	65-44761-10		UNIT ASSY, AIL/ELEV PWR CONTROL	C	RF
	65-44761-11		DELETED		
	65-44761-12		UNIT ASSY, AIL/ELEV PWR CONTROL	D	RF
	65-44761-14		UNIT ASSY, AIL/ELEV PWR CONTROL	E	RF
	65-44761-15		UNIT ASSY, AIL/ELEV PWR CONTROL	F	RF
	65-44761-16		UNIT ASSY, AIL/ELEV PWR CONTROL	G	RF
	65-44761-17		UNIT ASSY, AIL/ELEV PWR CONTROL	H	RF
	65-44761-18		UNIT ASSY, AIL/ELEV PWR CONTROL	I	RF
	65-44761-19		UNIT ASSY, AIL/ELEV PWR CONTROL	J	RF
	65-44761-20		UNIT ASSY, AIL/ELEV PWR CONTROL	K	RF
	65-44761-21		UNIT ASSY, AIL/ELEV PWR CONTROL	L	RF
	65-44761-22		UNIT ASSY, AIL/ELEV PWR CONTROL	M	RF
1	NAS813-14		. CAP, PROTECTIVE	ABCEHK	1
2	955235-4		. PLUG, SHIPPING		1
3	955235-6		. PLUG, SHIPPING		1
4	69-35587-3		. STRAP, NAMEPLATE		1
5	BAC27DHY216		. NAMEPLATE		1
5	BACN12A3MJ		. NAMEPLATE (OPT)	ABEHK	1
6	NAS1351-4H10P		. SCREW	ABEHK	4
6	MS16998-42		. SCREW (OPT)	ABEHK	4
6A	NAS1351-4H12P		. SCREW	C	4
7	59600-5003		. VALVE ASSY, HYD SOL, V92003 (BOEING 10-60811-1)(OPT) *[7]	ABEHK	1
7	45080		. VALVE ASSY, HYD SOL, V99643 (BOEING 10-60811-3)(OPT) *[7]	ABEHK	1
7	59600-5007		. VALVE ASSY, HYD SOL, V92003 (BOEING 10-60811-3)(OPT) *[7]	ABEHK	1
7	45080-1		. VALVE ASSY, HYD SOL, V99643 (BOEING 10-60811-8)(PREF) *[7]	ABEHK	1
7	59600-5011		. VALVE ASSY, HYD SOL, V92003 (BOEING 10-60811-9)(OPT) *[7]	ABEHK	1
7	881600-1001		. VALVE ASSY, HYD SOL, V92003 (BOEING 10-60811-13)(OPT) *[7]	ABEHK	1
7	10-60811-11		DELETED		
7A	69-54744-2		. COVER	C	1
8	69-20184-1		. PLATE ASSY, GASKET	ABCEHK	1
9	NAS1611-112		. PACKING, O-RING	ABEHK	1
10	NAS1351-4H28P		. SCREW	ABEHK	4
10	NAS1351-4H12P		. SCREW	C	4
10	MS16998-48		. SCREW (OPT)	ABEHK	4
11	75130		. SERVO VALVE, ELECTROHYDRAULIC V75250 (BOEING 10-60813-1)	ABEHK	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
11	0893701		. SERVO VALVE, ELECTROHYDRAULIC V75250 (BOEING 10-60813-1)	ABEHK	1
11	22280710		. SERVO VALVE, ELECTROHYDRAULIC V81873 (BOEING S252T001-3) (OPT) *[6]	ABEHK	1
11	22280710-001		. SERVO VALVE, ELECTROHYDRAULIC V81873 (BOEING S252T001-3) (OPT) *[6]	ABEHK	1
11	73016		. SERVO VALVE, ELECTROHYDRAULIC V75250 (BOEING S252T001-4) (OPT) *[6]	ABEHK	1
11	A71882		. SERVO VALVE, ELECTROHYDRAULIC V94697 (BOEING S252T001-5) (OPT) *[6]	ABEHK	1
11A	69-54744-1		. COVER	C	1
12	69-20185-1		. PLATE ASSY, GASKET	ABCEHK	1
13	NAS1611-112		. PACKING, O-RING	ABEHK	1
14	BACB30FD4H8		. BOLT (REPLD BY BACB30LE4HK8)		4
14	BACB30LE4HK8		. BOLT (REPLS BACB30FD4H8)		4
15	69-35661-1		. PLATE ASSY, GASKET		1
16	BACR12BM116		. RING, BACKUP		1
16	S12766-116		. RING, BACKUP, V97820 (OPT)		1
17	NAS1611-116		. PACKING		1
18	65-44828-4		. SERVO VALVE ASSY (FIG. 1102) (PREF) *[8]		1
18	65-44828-2		. SERVO VALVE ASSY (FIG. 1102) (OPT) *[8]		1
19	NAS679C4W		. NUT		2
20	MS20004H14		. BOLT		2
21	69-35666-1		. ARM ASSY, INPUT		1
22	65-44663-1		. . ARM, INNER		1
23	65-44664-1		. . ARM, OUTER		1
24	69-35772-1		. . WASHER		3
25	MS20426D4-8		. . RIVET		2
26	MS20426D4-22		. . RIVET		1
27	NAS1611-013		. PACKING		1
28	MKSP5E9104		. BEARING, V21335		1
28	MKSP5E9104A		. BEARING, V21335 (OPT)		1
28	BP-S-C		. BEARING, V77896 (OPT)		1
28	BACB10AR5		. BEARING (OPT)		1
29	66-22792-1		. PIN, LOCATING		2
29	66-22792-2		. PIN, LOCATING (0.2509-0.2510 DIA) (OPT) *[2]		AR
29	66-22792-3		. PIN, LOCATING (0.2514-0.2515 DIA) (OPT) *[2]		AR

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
29	66-22792-4		. PIN, LOCATING (0.2519-0.2520 DIA) (OPT) *[2]		AR
30	66-22798-1		. SPACER, INPUT SHAFT		1
31	69-35663-1		. PLUG, INPUT CAVITY		1
32	BACR12BM229		. RING, BACKUP		1
32	S12766-229		. RING, BACKUP, V97820 (OPT)		1
33	NAS1611-229		. PACKING, O-RING		1
34	69-35665-3		. SHAFT ASSY, INPUT (PREF)(FIG. 1103)	ABEHK	1
34	69-35665-3		. SHAFT ASSY, INPUT (OPT)(FIG. 1103)	CDFGI JLM	1
34	69-35665-1		. SHAFT ASSY, INPUT (OPT)(FIG. 1103)		1
34	69-35665-4		. SHAFT ASSY, INPUT (OPT)(FIG. 1103)		1
34	69-35665-6		. SHAFT ASSY, INPUT (PREF)(FIG. 1103) (LTD)	CDFGI JM	1
34	69-35665-6		. SHAFT ASSY, INPUT (PREF)(FIG. 1103)	L	1
34	69-35665-7		. SHAFT ASSY, INPUT (OPT)(FIG. 1103) (LTD)	CDFGI JM	1
34	69-35665-7		. SHAFT ASSY, INPUT (OPT)(FIG. 1103)	L	1
35	BACB10CF14PP		. BEARING (REPLS BACB10A28DDH)		1
35	BACB10A28DDH		. BEARING (REPLD BY BACB10CF14PP)		1
36	BACB10CF14		. BEARING (REPLS BACB10A28)		1
36	BACB10A28		. BEARING (REPLD BY BACB10CF14)		1
37	BACR12BD212NA		. RING (USED WITH NAS1611-212, ITEM 38)*[3]		1
37	BACR12AT212		. RING (USED WITH BACP11W212 OR NAS1611-212, ITEM 38)*[3]		1
38	BACP11W212		. PACKING, O-RING (USED WITH BACR12AT212)*[3]		1
38	NAS1611-212		. PACKING O-RING (USED WITH BACR12AT212 OR BACR12BD212NA, ITEM 37)*[3]		1
39	69-35688-1		. RETAINER, FILTER	ABCEHK	1
39	69-35688-2		. RETAINER, FILTER (REPLS 69-35688-1)	ABCEHK	1
40	BACR12BM219		. RING, BACKUP	ABCEHK	2
40	S12766-219		. RING, BACKUP, V97820 (OPT)	ABCEHK	2
41	NAS1611-219		. PACKING O-RING	ABCEHK	1
42	AC4638E1		. ELEMENT, 1 GPM FILTER, V18350 (BOEING 10-60808-1)(OPT)*[4]	ABEHK	1
42	21-10034		. ELEMENT, 1 GPM FILTER, V81873 (BOEING 10-60808-1)(OPT)*[4]	ABEHK	1
42	21-11175		. ELEMENT, 1 GPM FILTER, V81873 (BOEING 10-60808-1)(OPT)*[4]	ABEHK	1
42	4245-501		. ELEMENT, 1 GPM FILTER, V21550 (BOEING 10-60808-1, -3)(OPT)*[4]	ABEHK	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
42	7500271		. ELEMENT, 1 GPM FILTER, V81321 (BOEING 10-60808-1, -3)(OPT)*[4]	ABEHK	1
42	AC4638E11		. ELEMENT, 1 GPM FILTER, V18350 (BOEING 10-60808-3)(OPT)*[4]	ABEHK	1
42	AC8818E1		. ELEMENT, 1 GPM FILTER, V18350 (BOEING 60B80034-1)(OPT)*[4]	ABEHK	1
42	11-10106		. ELEMENT, 1 GPM FILTER, V14818 (BOEING 60B80034-1)(OPT)*[4]	ABEHK	1
42	4228-634		. ELEMENT, 1 GPM FILTER, V21550 (BOEING 60B80034-1)(OPT)*[4]	ABEHK	1
42	7553574		. ELEMENT, 1 GPM FILTER, V05228 (BOEING 60B80034-1)(OPT)*[4]	ABEHK	1
43	BACR12BM012		. RING, BACKUP	ABEHK	2
43	S12766-012		. RING, BACKUP, V97820 (OPT)	ABEHK	2
44	NAS1611-012		. PACKING, O-RING	ABEHK	1
45	69-35689-1		. RETAINER, FILTER		1
46	BACR12BM223		. RING, BACKUP		2
46	S12766-223		. RING, BACKUP, V97820 (OPT)		2
47	NAS1611-223		. PACKING, O-RING		1
48	AC4638E3		. ELEMENT, 6 GPM FILTER, V18350 (BOEING 10-60808-2)(OPT)*[5]		1
48	21-10033		. ELEMENT, 6 GPM FILTER, V81873 (BOEING 10-60808-2)(OPT)*[5]		1
48	21-11176		. ELEMENT, 6 GPM FILTER, V81873 (BOEING 10-60808-2)(OPT)*[5]		1
48	4245-502		. ELEMENT, 6 GPM FILTER, V21550 (BOEING 10-60808-2,-4)(OPT)*[5]		1
48	7500272		. ELEMENT, 6 GPM FILTER, V81321 (BOEING 10-60808-2,-4)(OPT)*[5]		1
48	AC4638E31		. ELEMENT, 6 GPM FILTER, V18350 (BOEING 10-60808-4)(OPT)*[5]		1
48	AC8818E2		. ELEMENT, 6 GPM FILTER, V18350 (BOEING 60B80034-2)(OPT)*[5]		1
48	11-10107		. ELEMENT, 6 GPM FILTER, V14818 (BOEING 60B80034-2)(OPT)*[5]		1
48	4228-633		. ELEMENT, 6 GPM FILTER, V21550 (BOEING 60B80034-2)(OPT)*[5]		1
48	7553575		. ELEMENT, 6 GPM FILTER, V05228 (BOEING 60B80034-2)(OPT)*[5]		1
49	BACR12BM116		. RING, BACKUP		2
49	S12766-116		. RING, BACKUP, V97820		2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
50	NAS1611-116		. PACKING, O-RING		1
51	NAS1351-4H16P		. SCREW	ABEHK	4
51	MS16998-45		. SCREW (OPT)	ABEHK	4
51	NAS1351-4H12P		. SCREW	C	4
52	GM502100-1		. TRANSDUCER ASSY, LINEAR, V22863 (BOEING 10-60810-4)	ABEHK	1
52A	69-54744-3		. COVER	C	1
53	NAS1611-112		. PACKING, O-RING	ABEHK	1
54	BACB30FD5H14		. BOLT (REPLD BY BACB30LE5HK14)		4
54	BACB30LE5HK14		. BOLT (REPLS BACB30FD5H14)		4
55	MS20002C5		. WASHER		4
56	69-35660-1		. FITTING ASSY, END (FIG. 1104)	ABEHK	1
56	69-35660-1		. FITTING ASSY, END (FIG. 1104) (USED WITH NAS1351-4H12P, ITEM 51 AND 69-54744-3, ITEM 52A) (OPT)	C	1
56A	65-44847-1		. FITTING ASSY, END (FIG. 1104)	CDFGJ	1
56A	65-44847-3		. FITTING ASSY, END (FIG. 1104)	ILM	1
57	NAS1611-112		. PACKING, O-RING	ABEHK	1
58	69-35667-1		. RETAINER	ABCEHK	1
59	BACR12BM114		. RING, BACKUP	ABCEHK	2
59	S12766-114		. RING, BACKUP, V97820 (OPT)	ABCEHK	2
60	NAS1611-114		. PACKING, O-RING	ABCEHK	1
61	69-54599-1		. PLUG, FLOW CONTROL	ABCEHK	1
61	2720C		. VALVE, THERMOSTATIC CONTROL, V93835 (BOEING 10-60809-1) (OPT)	A	1
61	59800-5001		. VALVE, THERMOSTATIC CONTROL, V92003 (BOEING 10-60809-1) (OPT)	A	1
62	BACR12BM012		. RING, BACKUP	ABCEHK	2
62	S12766-012		. RING, BACKUP, V97820 (OPT)	ABCEHK	2
63	NAS1611-012		. PACKING, O-RING	ABCEHK	1
64	BACB30US4P6H		. BOLT (PREF)		4
64	BACB30US4K6H		. BOLT (REPLS BACB30MT4HT6)		4
64	BACB30MT4HT6		. BOLT (REPLS BACB30CW4H6) (REPLD BY BACB30US4K6H)		4
64	BACB30CW4H6		. BOLT (REPLD BY BACB30MT4HT6)		4
65	MS20002C4		. WASHER		4
66	69-35686-1		. FLANGE		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
67	65-44834-1		. ROD END ASSY		1
68	MS21232-10		. . BEARING		1
69	65-44834-2		. . ROD END		1
70	NAS1080R8		. COLLAR (USED WITH BACB30DX8-19)		1
70	BACC30BH8		. COLLAR (USED WITH BACB30MB8A19)		1
71	AN960C416		. WASHER		1
72	BACB30DX8-19		. BOLT		1
72	BACB30MB8A19		. BOLT (OPT)		1
73	BACS34A5		. SCRAPER		1
74	66-22790-1		. RETAINER		1
74A	S34852-210H5		. SEAL ASSY, V97820 (REPLS S32953)		1
74A	S32953		. SEAL ASSY, V97820 (REPLD BY S34852-210H5)		1
74A	7210FT952T		. SEAL ASSY, V72902 (OPT TO S32953)	A-F	1
74A	595-21000-952 -0190		. SEAL ASSY, V72902 (OPT TO S32953)	A-F	1
75	BACR12BJ210A		. RING, CHANNEL SEAL (USED WITH NAS1611-210, OPT TO S32953))	A-F	1
76	NAS1611-210		. PACKING (USED WITH BACR12BJ210A, OPT TO S32953)	A-F	1
77	BACR12BM218		. RING, BACKUP		2
77	S12766-218		. RING, BACKUP, V97820 (OPT)		2
78	NAS1611-218		. PACKING		1
79	712B5MRL952N		. SEAL, V72902		1
79	DBPRS02 -1492X111		. RING, PISTON SEAL, V18426 (OPT)		1
79	S40474		. PACKING, V97820 (OPT)		1
80	69-35687-1		. BEARING		1
81	S33709-214H99		. SEAL ASSY, V97820		1
81	596N21401-952 -0190		. SEAL ASSY, V72902 (PREF OPT TO S33709-214H99)		
81	596N21401-952 -0170		. SEAL ASSY, V72902 (OPT TO S33709-214H99)		1
81	7214MT952T		. SEAL ASSY, V72902 (OPT TO S33709-214H99)	A-F	1
81	65-44583-2		. SEAL ASSY, PISTON (OPT TO S33709-214H99)	A-F	1
81	242615-1		. SEAL ASSY, PISTON (0.015 OVERSIZE) (V92003)*[1]		1
81	721S4MT952T		. SEAL ASSY, PISTON (0.015 OVERSIZE) (V72902)(OPT TO 242615-1)*[1]		1
81	596N21401-952 -0191		. SEAL ASSY, PISTON (0.015 OVERSIZE) (V72902)(OPT)*[1]		1
81	242615-3		. SEAL ASSY, PISTON (0.030 OVERSIZE) (V92003)*[1]		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
81	721T4MT952T		. SEAL ASSY, PISTON (0.030 OVERSIZE) (V72902)(OPT TO 242615-3)*[1]		1
81	596N21401-952-0192		. SEAL ASSY, PISTON (0.030 OVERSIZE) (V72902) (OPT)*[1]		1
82	65-44583-13		. . SEAL		
82	242615-11		. . SEAL (0.015 OVERSIZE) (USED ON 242615-1		2
82	242615-13		. . SEAL (0.030 OVERSIZE) (USED ON 242615-3)		2
83	65-44583-14		. . SEAL		1
83	242615-19		. . SEAL (0.015 OVERSIZE) (USED ON 242615-1)		1
83	242615-21		. . SEAL (0.030 OVERSIZE) (USED ON 242615-3)		1
84	65-44583-10		. . KEY		1
84	242615-9		. . KEY (OVERSIZE) (USED ON 242615-1, 242615-3)		1
85	65-44666-1		. PISTON	ABEHK	1
85	65-44673-1		. PISTON (OPT TO 65-44666-1)	ABEHK	1
85	242611-1		. PISTON (0.015 OVERSIZE) (V92003) *[1]		1
85	242611-3		. PISTON (0.030 OVERSIZE) (V92003) *[1]		
85	65-44773-1		. PISTON	CDFGIJ LM	1
85	65-44666-1		. PISTON (OPT TO 65-44773-1) (USED WITH ITEM 85A)	C	1
85	65-44673-1		. PISTON (OPT TO 65-44773-1 (USED WITH ITEM 85A)	C	1
85A	65-44761-13		. SPACER (USED WITH 65-44666-1 AND 65-44673-1)	C	1
86	BACS34A5		. SCRAPER		1
87	66-22790-1		. RETAINER		1
88	S34852-210H5		. SEAL ASSY, V97820 (REPLS S32953)		1
88	S32953		. SEAL ASSY, V97820 (REPLD BY S34852-210H5)		1
88	595-21000-952-0190		. SEAL ASSY, V72902 (OPT TO S32953)		1
88	7210FT952T		. SEAL ASSY, V72902 (OPT S32953)	A-F	1
88	BACR12BJ210A		. RING, CHANNEL SEAL (USED WITH NAS1611-210, OPT TO S32953)	A-F	1
89	NAS1611-210		. PACKING (USED WITH BACR12BJ210A, OPT TO S32953)	A-F	1
90	BACR12BM218		. RING, BACKUP		2
90	S12766-218		. RING, BACKUP, V97820 (OPT)		2
91	NAS1611-218		. PACKING		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
92	712B5MRL952N		. SEAL, V72902		1
92	DBPRS02-1492X111		. RING, PISTON SEAL, V18426 (OPT)		1
92	S40474		. PACKING, V97820 (OPT)		1
93	69-35687-1		. BEARING		1
94	69-35668-1		. RETAINER	ABCEHK	1
95	NAS1611-222		. PACKING	ABCEHK	1
96	66-22802-1		. PLUG, RET	ABCEHK	1
97	66-22803-1		. PLATE, LOCKING	ABCEHK	1
98	NAS1611-010		. PACKING	ABCEHK	1
99	69-35694-1		. SHAFT	ABCEHK	1
100	NAS679C4W		. NUT	ABEHK	1
101	NAS1193-4C		. DEVICE, LOCKING	ABEHK	1
102	69-35669-1		. GUIDE, SPRING	ABEHK	1
103	69-35811-1		. SPRING	ABEHK	1
104	65-44583-9		. SEAL ASSY, PISTON	ABEHK	1
104	65-44583-5		. SEAL ASSY, PISTON (OPT)	AB	1
105	65-44583-19		. . SEAL, CHAMFER (USED ON 65-44583-5)		2
105	65-44583-29		. . SEAL, CHAMFER (USED ON 65-44583-9)		2
106	65-44583-20		. . SEAL (USED ON 65-44583-5)		1
106	65-44583-28		. . SEAL (USED ON 65-44583-9)		1
107	65-44583-10		. . KEY		1
108	65-44583-8		. SEAL ASSY, PISTON	ABEHK	1
108	65-44583-4		. SEAL ASSY, PISTON (OPT)	AB	1
109	65-44583-17		. . SEAL, CHAMFER (USED ON 65-44583-4)		2
109	65-44583-27		. . SEAL, CHAMFER (USED ON 65-44583-8)		2
110	65-44583-18		. . SEAL (USED ON 65-44583-4)		1
110	65-44583-26		. . SEAL (USED ON 65-44583-8)		1
111	65-44583-10		. . KEY		1
112	69-35670-1		. PISTON	ABEHK	1
113	65-44665-1		. ARM ASSY	ABEHK	1
114	66-22806-1		. . RIVET		1
115	65-44665-4		. . WASHER		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
116	66-22793-1		. . BUSHING		1
116	66-22793-2		. . BUSHING (OPT)		1
117	69-35699-1		. . CLEVIS		1
118	65-44665-2		. . ARM		1
119	69-35692-1		. RETAINER		1
120	BACR12BM117		. RING, BACKUP		2
120	S12766-117		. RING, BACKUP, V97820 (OPT)		2
121	NAS1611-117		. PACKING, O-RING		1
122	BACR12BM111		. RING, BACKUP		2
122	S12766-111		. RING, BACKUP, V97820 (OPT)		2
123	NAS1611-111		. PACKING, O-RING		1
124	BACR12BM112		. RING, BACKUP		8
124	S12766-112		. RING, BACKUP, V97820 (OPT)		8
125	NAS1611-112		. PACKING, O-RING		4
126	66-22801-1		. VALVE ASSY, BYPASS (MATCHED SET)		1
126	66-22801-2		. VALVE ASSY, BYPASS (OPT)(MATCHED SET)		1
127	69-35693-1		. . SLIDE (USED ON 66-22801-1)		1
127	69-35693-2		. . SLIDE (USED ON 66-22801-1)(OPT)		1
127	69-35693-3		. . SLIDE (USED ON 66-22801-2)		1
127	69-35693-4		. . SLIDE (USED ON 66-22801-2)(OPT)		1
128	65-44668-1		. . SLEEVE (USED ON 65-22801-1)		1
128	65-44668-2		. . SLEEVE (USED ON 65-22801-1)(OPT)		1
128	65-44668-3		. . SLEEVE (USED ON 65-22801-2)		1
128	65-44668-4		. . SLEEVE (USED ON 65-22801-2)(OPT)		1
129	66-22799-1		. SPRING		1
130	69-35695-1		. GUIDE, SPRING		1
131	69-35690-1		. RETAINER	ABCEHK	1
132	BACR12BM119		. RING, BACKUP	ABCEHK	2
132	S12766-119		. RING, BACKUP, V97820 (OPT)	ABCEHK	2
133	NAS1611-119		. PACKING, O-RING	ABCEHK	1
134	66-22796-1		. SPRING	ABCEHK	1
135	BACR12BM113		. RING, BACKUP	ABCEHK	10
135	S12766-113		. RING, BACKUP, V97820 (OPT)	ABCEHK	10
136	NAS1611-113		. PACKING, O-RING	ABCEH	5
137	69-35662-1		. VALVE ASSY, SHUTOFF	ABCEHK	1
137	69-35662-2		. VALVE ASSY, SHUTOFF (OPT)	ABCEHK	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
138	65-44814-1		. . SLIDE (USED ON 69-35662-1)		1
138	65-44814-2		. . SLIDE (USED ON 69-35662-1)(OPT)		1
138	65-44814-3		. . SLIDE (USED ON 69-35662-2)		1
138	65-44814-4		. . SLIDE (USED ON 69-35662-2)(OPT)		1
139	65-44667-1		. . SLEEVE (USED ON 69-35662-1)		1
139	65-44667-2		. . SLEEVE (USED ON 69-35662-1)(OPT)		1
139	65-44667-3		. . SLEEVE (USED ON 69-35662-2)		1
139	69-44667-3		DELETED		
139	65-44667-4		. . SLEEVE (USED ON 69-35662-2)(OPT)		1
139	69-44667-4		DELETED		
140	65-44836-1		. MANIFOLD ASSY (FIG. 1106)	A	1
140	65-44836-17		. MANIFOLD ASSY (FIG. 1106)	BEH	1
140	65-44836-18		. MANIFOLD ASSY (FIG. 1106)	C	1
140	65-44836-19		. MANIFOLD ASSY (FIG. 1106)	K	1
140	65-44845-1		DELETED		
140	65-44845-5		. MANIFOLD ASSY (FIG. 1106A)	DG	1
140	65-44845-10		. MANIFOLD ASSY (FIG. 1106A)	F	1
140	65-44845-11		. MANIFOLD ASSY (FIG. 1106A)	I	1
140	65-44845-14		. MANIFOLD ASSY (FIG. 1106A)	J	1
140	65-44845-15		. MANIFOLD ASSY (FIG. 1106A)	L	1
140	65-44845-16		. MANIFOLD ASSY (FIG. 1106A)	M	1
141	NAS1351-4-20		DELETED		
142	69-54781-1		DELETED		

*[1] REPAIR PARTS. 0.015 OVERSIZE PARTS MUST BE USED TOGETHER AND 0.030 OVERSIZE PARTS MUST BE USED TOGETHER (REF MANIFOLD (37, FIG. 1106; 50, FIG. 1106A).

*[2] REPAIR PART. USED ON 69-35665-3 SHAFT ASSY (34)

*[3] BACR12ATZ12 USED WITH NAS1611-212 OPT TO BACR12BD212NA USED WITH NAS1611-212 OPT TO BACR12AT212 USED WITH BACP11W212. BACR12AT212 USED WITH BACP11W212 PREF.

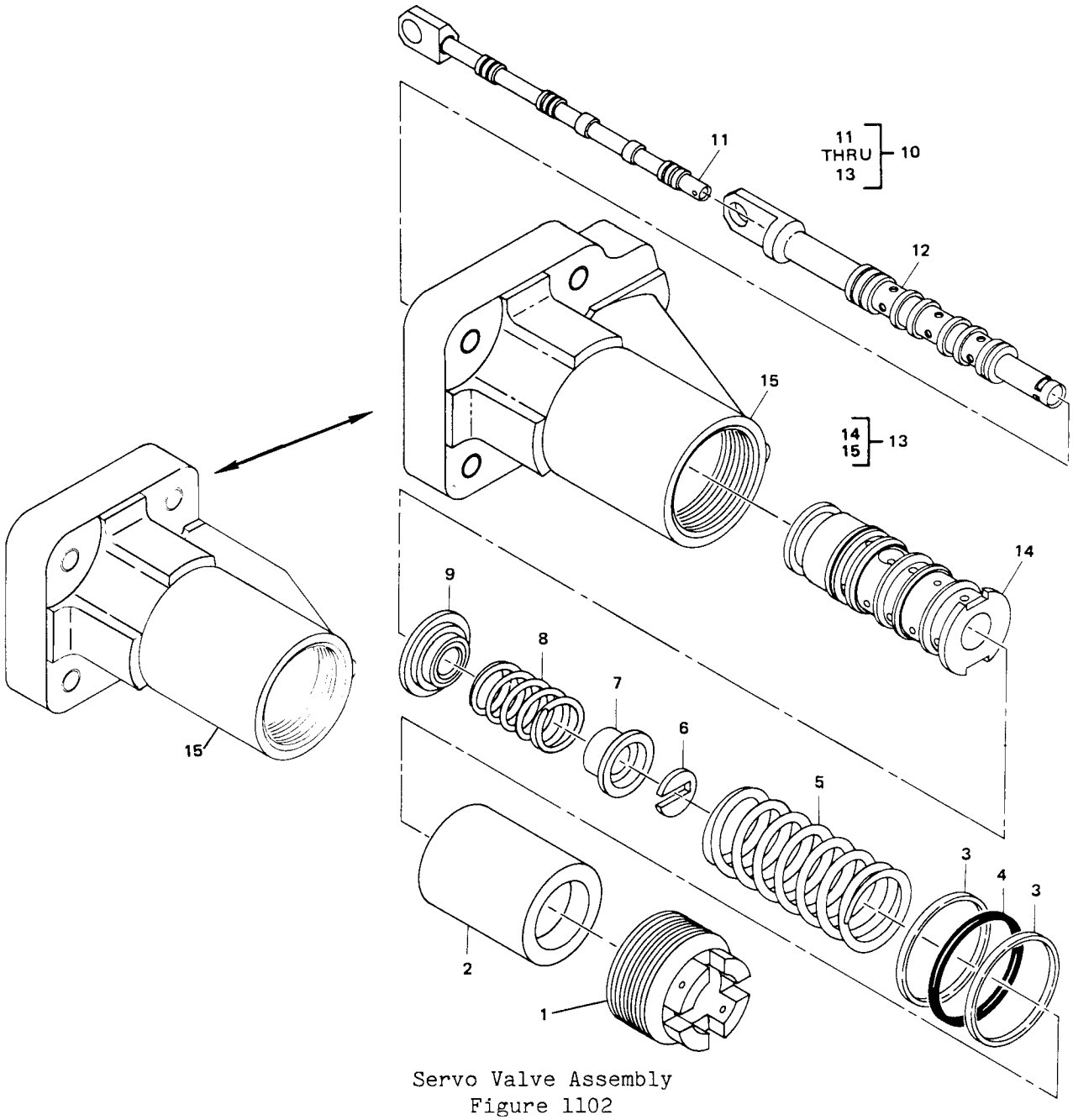
*[4] BOEING SPEC 10-60808-1 AND 60B80034-1 OPTIONAL TO 10-60808-3.

*[5] BOEING SPEC 10-60808-2 AND 60B80034-2 OPTIONAL TO 10-60808-4.

*[6] BOEING SPEC S252T001-3, S252T001-4, OR S252T001-5 OPTIONAL TO 10-60813-1.

*[7] BOEING SPEC 10-60811-1, 10-60811-3, 10-60811-9 OR 10-60811-13 ARE OPTIONAL TO 10-60811-8, UNTIL CURRENT SUPPLIES ARE EXHAUSTED. BOEING SPEC 10-60811-8 IS PREFERRED.

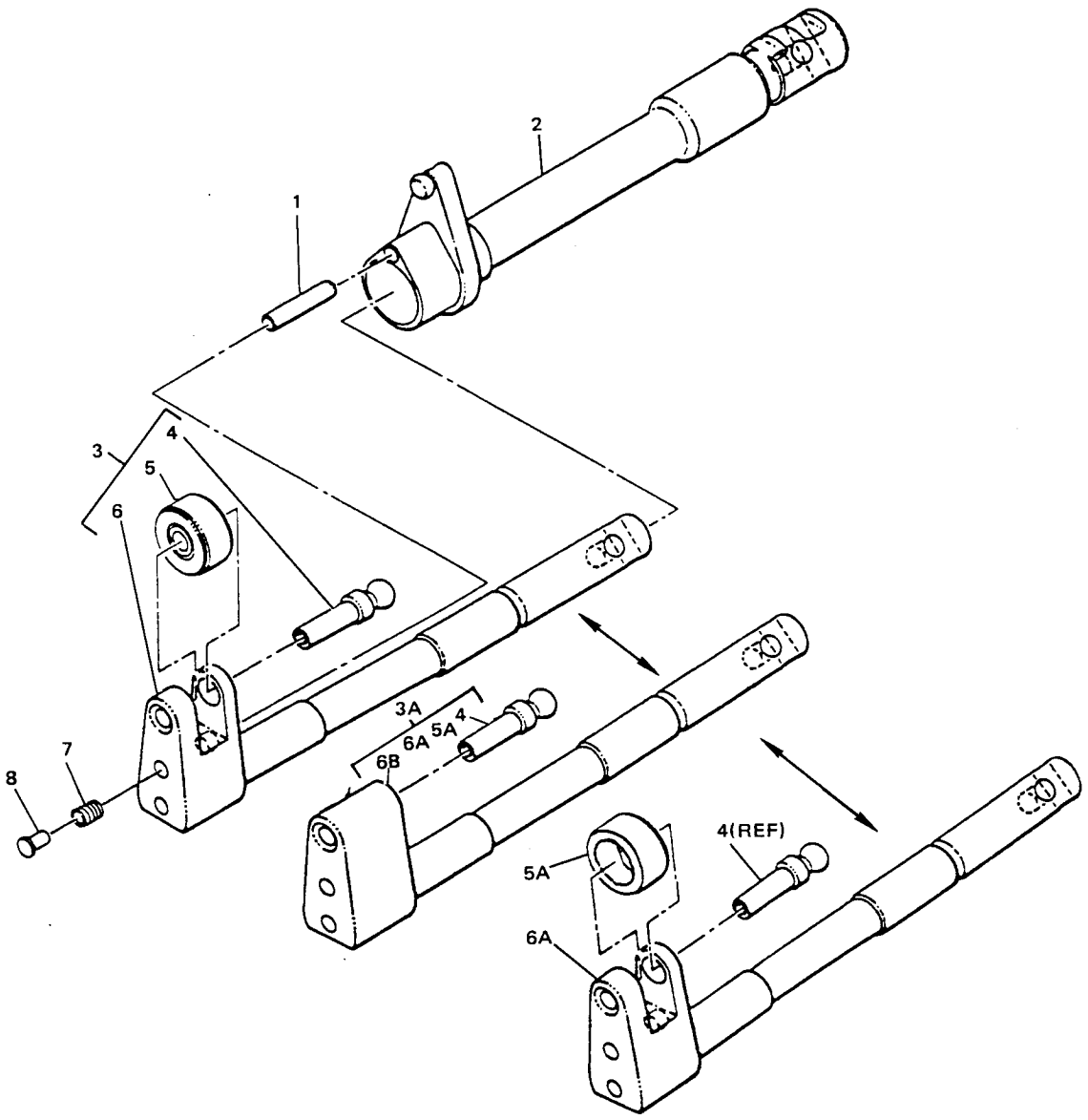
*[8] SEE REPAIR, PAR. 3.D. AND 3.C.(6) FOR 65-44828-2 AND -4 INTERCHANGEABILITY INSTRUCTIONS.



Servo Valve Assembly
Figure 1102

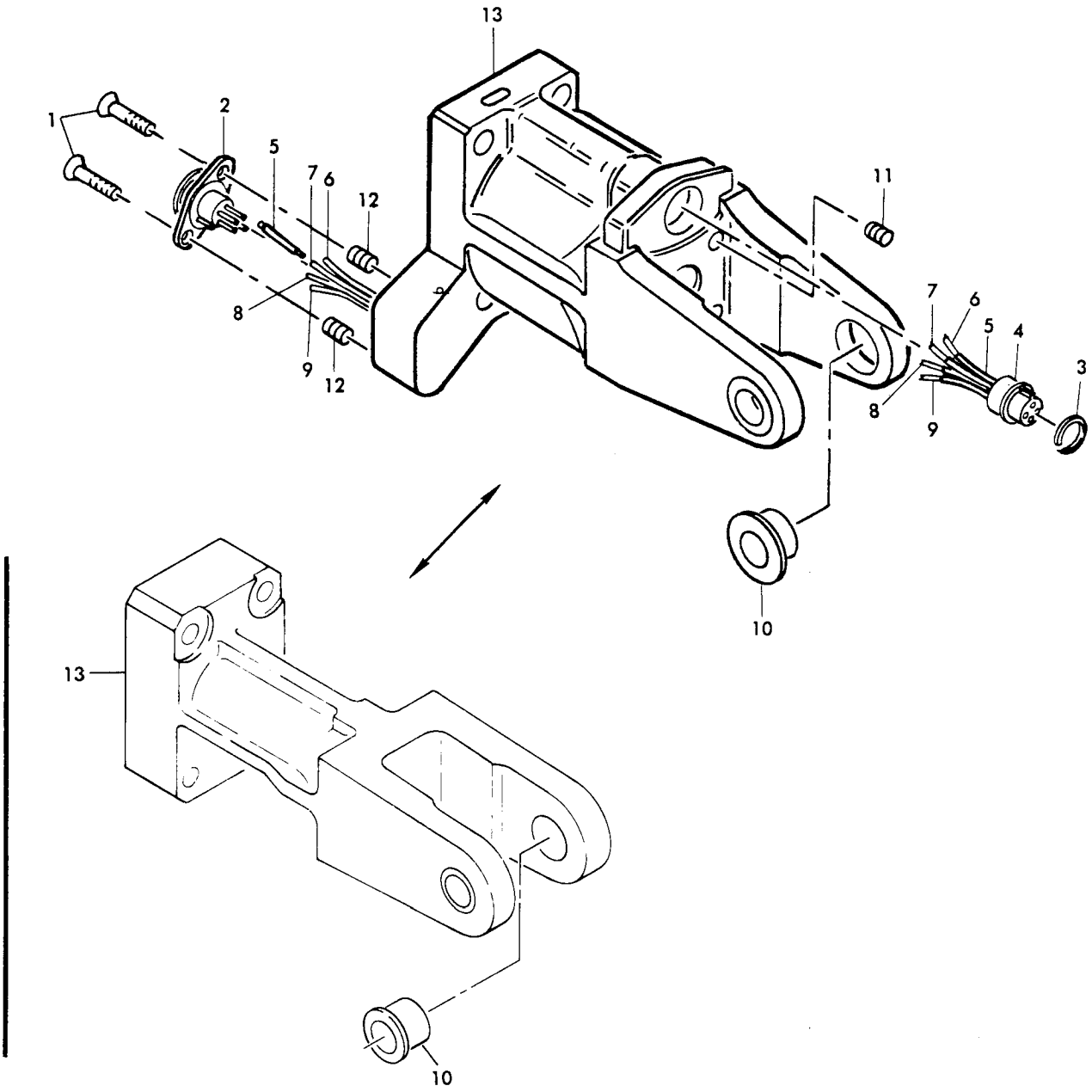
FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102-					
	65-44828-2		VALVE ASSY, AIL/ELEV PWR CONT UNIT SERVO	A	RF
	65-44828-4		VALVE ASSY, AIL/ELEV PWR CONT UNIT SERVO	B	RF

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102-					
1	66-22832-1		. NUT		1
2	69-35654-1		. RETAINER		1
3	S12766-123		. RING, BACKUP, V97820		2
4	NAS1611-123		. PACKING		1
5	69-35774-1		. SPRING		1
6	66-22813-1		. KEEPER		1
7	69-35698-1		. GUIDE		1
8	69-35775-1		. SPRING		1
9	69-35656-1		. SEAT		1
10	65-44671-1		. SLIDE ASSY (OPT)(MATCHED SET)	A	1
10	65-44671-3		. SLIDE ASSY (MATCHED SET)		1
10	65-44671-7		. SLIDE ASSY (OPT)(MATCHED SET)		1
11	65-44826-1		. . SLIDE, PRIMARY (USED ON 65-44671-1,-3)		1
11	65-44826-2		. . SLIDE, PRIMARY (USED ON 65-44671-3)(OPT)		1
11	65-44826-3		. . SLIDE, PRIMARY (USED ON 65-44671-7)		1
11	65-44826-4		. . SLIDE, PRIMARY (USED ON 65-44671-7)(OPT)		1
11	65-44826-5		. . SLIDE, PRIMARY (USED ON 65-44671-3)		1
12	65-44833-1		. . SLIDE, SECONDARY (USED ON 65-44671-1,-3)		1
12	65-44833-2		. . SLIDE, SECONDARY (USED ON 65-44671-1,-3)(OPT)		1
12	65-44833-3		. . SLIDE, SECONDARY (USED ON 65-44671-7)		1
12	65-44833-4		. . SLIDE, SECONDARY (USED ON 65-44671-7)(OPT)		1
13	65-44671-2		. . HOUSING - SLEEVE ASSY (USED ON 65-44671-1)		1
13	65-44671-4		. . HOUSING - SLEEVE ASSY (USED ON 65-44671-3)		1
13	65-44671-8		. . HOUSING - SLEEVE ASSY (USED ON 65-44671-7)		1
14	65-44832-1		. . . SLEEVE (USED ON 65-44671-2,-4)		1
14	65-44832-2		. . . SLEEVE (USED ON 65-44671-8)		1
14	65-44832-3		. . . SLEEVE (USED ON 65-44671-8) (OPT)		1
15	65-44838-1		. . . HOUSING (USED ON 65-44761-2)		1
15	65-44838-3		. . . HOUSING (USED ON 65-44761-4, -8)(OPT)		1
15	65-44838-4		. . . HOUSING (USED ON 65-44761-4, -8)(OPT)		1
15	65-44838-5		. . . HOUSING (USED ON 65-44761-4,-8)		1



Input Shaft Assembly
Figure 1103

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1103-					
	69-35665-1		SHAFT ASSY, INPUT	A	RF
	69-35665-3		SHAFT ASSY, INPUT	B	RF
	69-35665-4		SHAFT ASSY, INPUT	C	RF
	69-35665-6		SHAFT ASSY, INPUT	D	RF
	69-35665-7		SHAFT ASSY, INPUT	E	RF
1	66-22791-1		. PIN	A	1
1	66-22791-2		. PIN	BD	1
1	66-22791-3		. PIN	CE	1
2	65-44662-1		. SHAFT, OUTER		1
3	69-35665-2		. SHAFT ASSY, INNER	ABC	1
3A	69-35665-5		. SHAFT ASSY, INNER	DE	1
4	69-35664-1		. . BALL		1
5	69-35653-1		. . BEARING	ABC	1
5A	69-78445-1		. . SPACER (ITEM 6A WITH ITEM 5A OPT TO ITEM 6B)	DE	1
6	65-44661-1		. . SHAFT, INNER	ABC	1
6A	65-44661-1		. . SHAFT, INNER (ITEM 6A WITH ITEM 5A OPT TO ITEM 6B)	DE	1
6B	65-44661-3		. . SHAFT, INNER (ITEM 6A WITH ITEM 5A OPT TO ITEM 6B)	DE	1
7	BACP20AX15DA		. PLUG	BCDE	1
8	BACP20AX15DAP		. PIN	BCDE	1



End Fitting 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-					
	69-35660-1		END FITTING ASSY, AIL/ELEV PCU	A	RF
	65-44847-1		END FITTING ASSY, AIL/ELEV PCU	B	RF
	65-44847-3		END FITTING ASSY, AIL/ELEV PCU	C	RF
1	AN507C632-5		. SCREW	A	2
2	000101-0172		. RECEPTACLE ASSY, V05574	A	1
3	UR50S		. RING, RETAINER, V80756	A	1
3	UR50		. RING, RETAINER, V80756 (OPT)	A	1
4	000100-0113		. PLUG ASSY, V05574	A	1
5	69-35660-6		. TUBING	A	8
6	69-35660-2		. WIRE	A	1
7	69-35660-3		. WIRE	A	1
8	69-35660-4		. WIRE	A	1
9	69-35660-5		. WIRE	A	1
10	69-35659-1		. BUSHING		2
11	MS21209F4-15		. INSERT	A	4
12	MS21209C0615		. INSERT	A	2
13	65-44837-1		. FITTING, END	A	1
13	65-44847-2		. FITTING, END	B	1
13	65-44847-4		. FITTING, END	C	1

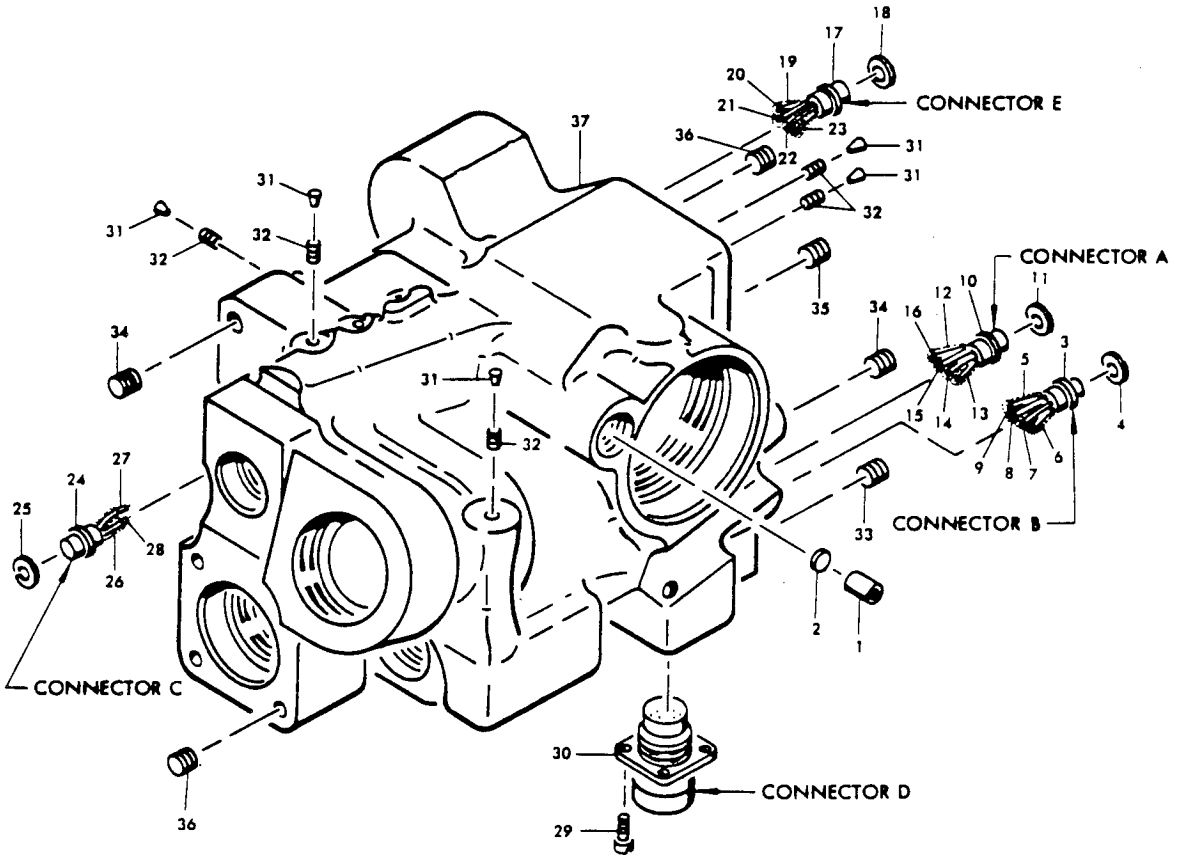

CONNECTOR A
CONNECTOR B
CONNECTOR C
CONNECTOR D
CONNECTOR E

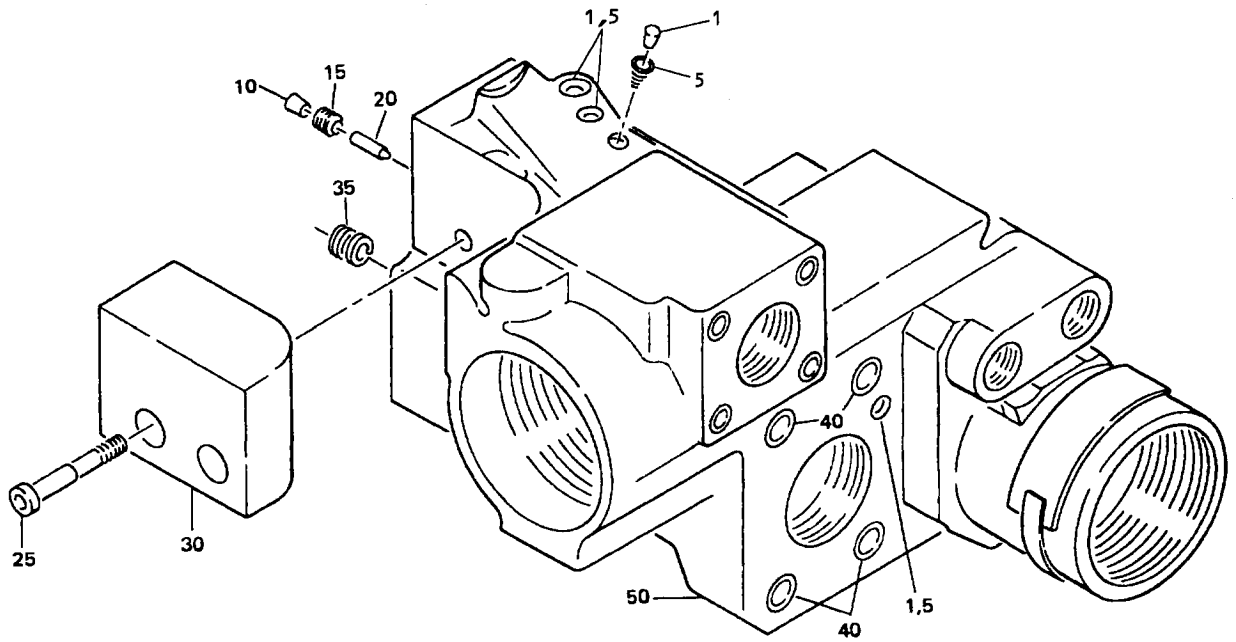
FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1106-					
	65-44836-1		MANIFOLD ASSY, AIL/ELEV PCU	A	RF
	65-44836-17		MANIFOLD ASSY, AIL/ELEV PCU	B	RF
	65-44836-18		MANIFOLD ASSY, AIL/ELEV PCU	C	RF
	65-44836-19		MANIFOLD ASSY, AIL/ELEV PCU	D	RF
1	66-22805-1		. BUSHING	ABD	1
2	66-22804-1		. PLATE	ABD	1
3	000100-0113		. PLUG ASSY, V05574	ABD	1
4	UR50S		. RING, RETAINER, V80756	ABD	1
4	UR50		. RING, RETAINER, V80756 (OPT)	ABD	1
5	65-44836-16		. TUBING	ABD	4
6	65-44836-2		. WIRE	ABD	1
7	65-44836-3		. WIRE	ABD	1
8	65-44836-4		. WIRE	ABD	1
9	65-44836-5		. WIRE	ABD	1
10	000100-0113		. PLUG ASSY, V05574	ABD	1
11	UR50S		. RING, RETAINER, V80756	ABD	1
11	UR50		. RING, RETAINER, V80756 (OPT)	ABD	1
12	65-44836-16		. TUBING	ABD	4
13	65-44836-6		. WIRE	ABD	1
14	65-44836-7		. WIRE	ABD	1
15	65-44836-8		. WIRE	ABD	1
16	65-44836-9		. WIRE	ABD	1
17	000100-0113		. PLUG ASSY, V05574	A	1
18	UR50S		. RING, RETAINER, V80756	A	1
18	UR50		. RING, RETAINER, V80756 (OPT)	A	1
19	65-44836-16		. TUBING	A	4
20	65-44836-10		. WIRE	A	1
21	65-44836-11		. WIRE	A	1
22	65-44836-12		. WIRE	A	1
23	65-44836-13		. WIRE	A	1
24	000100-0113		. PLUG ASSY, V05574	ABD	1
25	UR50S		. RING, RETAINER, V80756	ABD	1
25	UR50		. RING, RETAINER, V80756 (OPT)	ABD	1
26	65-44836-16		. TUBING	ABD	2
27	65-44836-14		. WIRE	ABD	1
28	65-44836-15		. WIRE	ABD	1
29	AN500AD4-5		. SCREW	ABD	4
30	BACC45FN12-12P		. CONNECTOR	ABD	1
30	48-10R12-12P (120)		DELETED		
31	BACP20AX18DP		. PIN		7
32	BACP20AX18D		. PLUG		7
33	MS21209F1-15		. INSERT		1
34	MS21209F4-15		. INSERT		8
35	MS21209F5-15		. INSERT		4

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1106-					
36	MS21209F4-20		. INSERT		8
37	65-44835-1		. MANIFOLD	A	1
37	65-44835-7		. MANIFOLD	B	1
37	65-44835-3		. MANIFOLD (OPT)	B	1
37	65-44835-4		. MANIFOLD (OPT)	B	1
37	65-44835-9		. MANIFOLD (OPT)	B	1
37	65-44835-4		. MANIFOLD	C	1
37	65-44835-3		. MANIFOLD (OPT)	C	1
37	65-44835-11		. MANIFOLD	D	1
37	242610-1		. MANIFOLD (0.015 OVERSIZE ANODIZED BORE), V92003 *[1]		1
37	242610-3		. MANIFOLD (0.030 OVERSIZE ANODIZED BORE), V92003 *[2]		1
37	242610RW1		. MANIFOLD (STD SIZE CHROME PLATED BORE), V92003 (REPAIR PART)		1
37	242610RW1-1		. MANIFOLD (0.015 OVERSIZE CHROME PLATED BORE), V92003 *[1]		1
37	242610RW1-3		. MANIFOLD (0.030 OVERSIZE CHROME PLATED BORE), V92003 *[2]		1
37	65C30861-1		. MANIFOLD ASSY (SLEEVED BORE) *[3]		1

*[1] REPAIR PART USED WITH 0.015 OVERSIZE PARTS (REF ITEMS 81, 85, Fig. 1101)

*[2] REPAIR PART USED WITH 0.030 OVERSIZE PARTS (REF ITEMS 81, 85, Fig. 1101)

*[3] REPAIR PART USING 65C30861-2 SLEEVE



Manifold Assembly
Figure 1106A

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1106A-					
	65-44845-1		DELETED		
	65-44845-5		MANIFOLD ASSY, AIL/ELEV PCU	A	RF
	65-44845-10		MANIFOLD ASSY, AIL/ELEV PCU	B	RF
	65-44845-11		MANIFOLD ASSY, AIL/ELEV PCU	C	RF
	65-44845-14		MANIFOLD ASSY, AIL/ELEV PCU	D	RF
	65-44845-15		MANIFOLD ASSY, AIL/ELEV PCU	E	RF
	65-44845-16		MANIFOLD ASSY, AIL/ELEV PCU	F	RF
1	BACP20AX18DP		• PIN		5
5	BACP20AX18D		• PLUG		5
10	BACP20AX25DAP		• PIN		1
15	BACP20AX25DA		• PLUG		1
15	BACP20AX25DAX		• PLUG (OVERSIZED), (USED WITH JETX0527200B)		1
20	JETX0527100B		• RESISTOR, FIXED (REPLCS JETA1875500D) *[4]		1
20	JETA1875500D		• RESISTOR, FIXED (REPLD BY JETX0527100B) *[4]		1
20	JETX0527200B		• RESISTOR, FIXED (OVERSIZED) *[5]		1
25	NAS1351-4-20		• CAPSCREW	ABD	2
30	69-54781-1		• WEIGHT	AD	1
30	69-54781-2		• WEIGHT	B	1
35	MS21209F420		• INSERT, THREAD		8
40	MS21209F515		• INSERT, THREAD		4
45	65-44845-2		DELETED		

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FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1106A-					
50	65-44845-4		• MANIFOLD (OPT)	AB	1
50	65-44845-7		• MANIFOLD	ABC	1
50	65-44845-9		• MANIFOLD (OPT)	ABC	1
50	65-44845-13		• MANIFOLD	DE	1
50	242616RW1		• MANIFOLD (STD SIZE CHROME PLATED BORE) V92003 (REPAIR PART)	A-E	1
50	242616RW1-1		• MANIFOLD (0.015 OVERSIZE CHROME PLATED BORE) V92003 *[1]	A-E	1
50	242616RW1-3		• MANIFOLD (0.030 OVERSIZE CHROME PLATED BORE) V92003 *[2]	A-E	1
50	65C30861-1		• MANIFOLD ASSY (SLEEVED BORE) *[3]	A-E	1
50	65-44845-18		• SLEEVE - MANIFOLD ASSY	F	1
-55	65-44845-17		• • MANIFOLD (MATCHED SET)	F	1
-60	69-77393-1		• • STEEL SLEEVE (MATCHED SET)	F	1

- ITEM NOT ILLUSTRATED

*[1] REPAIR PART USED WITH 0.015 OVERSIZE PARTS (REF ITEMS 81, 85, FIG. 1101)

*[2] REPAIR PART USED WITH 0.030 OVERSIZE PARTS (REF ITEMS 81, 85, FIG. 1101)

*[3] REPAIR PART USING 65C30861-2 SLEEVE

*[4] REPLACEMENT OF RESISTOR JETA18755OOD WITH RESISTOR JETXO527100B IS REQUIRED PER SERVICE LETTER 737-SL-27-71 AND AIRWORTHINESS DIRECTIVE AD-97-05-09. SEE RESISTOR REPLACEMENT INSTRUCTIONS (PAGE 418) FOR AFFECTED UNITS AND ADDITIONAL INFORMATION.

*[5] OVERSIZE (0.010) REPLACEMENT FOR RESISTOR ITEM (20, P/N JETXO527100B)

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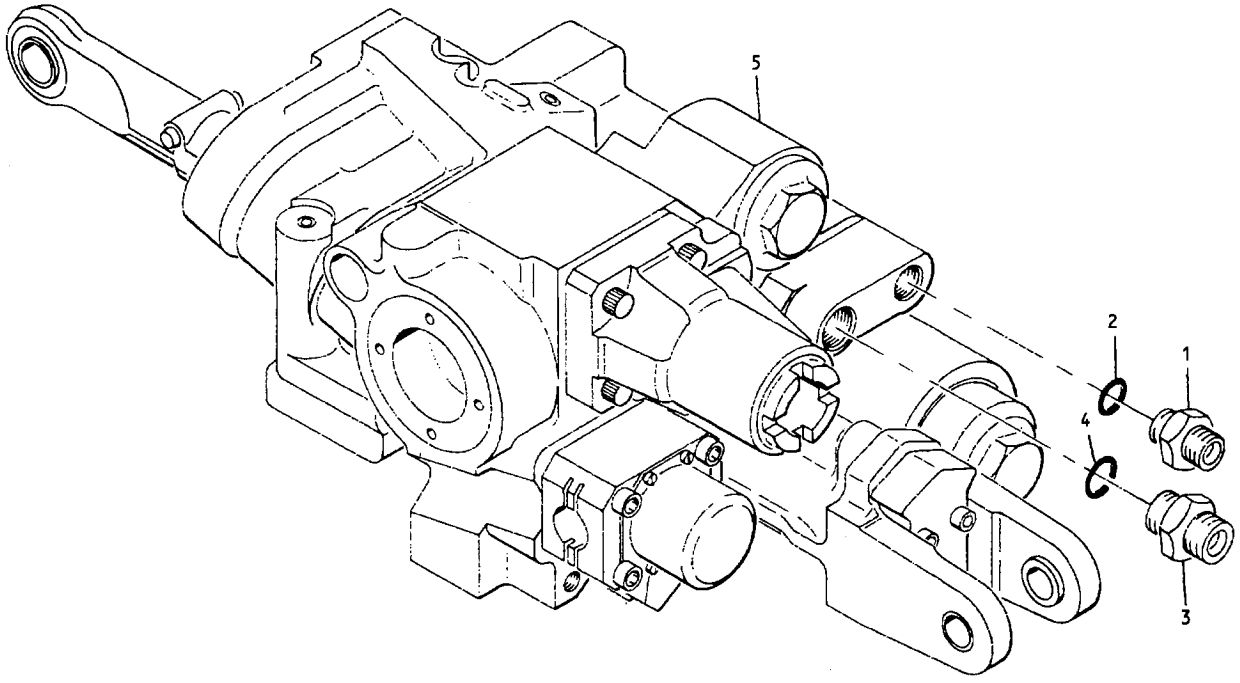

Aileron and Elevator Power Control Unit Assembly
Figure 1107

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1107-					
	65-45180-2		UNIT ASSY, ELEV PWR CONT	A	RF
	65-45180-4		UNIT ASSY, ELEV PWR CONT	B	RF
	65-45180-5		UNIT ASSY, ELEV PWR CONT	C	RF
	65-45180-7		UNIT ASSY, ELEV PWR CONT	D	RF
	65-45180-8		UNIT ASSY, ELEV PWR CONT	E	RF
	65-45180-13		UNIT ASSY, ELEV PWR CONT	F	RF
	65-45180-14		DELETED		
	65-45180-18		UNIT ASSY, ELEV PWR CONT	G	RF
	65-45180-19		UNIT ASSY, ELEV PWR CONT	H	RF
	65-45180-22		UNIT ASSY, ELEV PWR CONT	I	RF
	65-45180-23		UNIT ASSY, ELEV PWR CONT	J	RF
	65-45180-27		UNIT ASSY, ELEV PWR CONT	K	RF
	65-45180-29		UNIT ASSY, ELEV PWR CONT	L	RF
	65-45180-30		UNIT ASSY, ELEV PWR CONT	M	RF
	65-45180-31		UNIT ASSY, ELEV PWR CONT	N	RF
	65-45180-34		UNIT ASSY, ELEV PWR CONT	O	RF
	65-45180-35		UNIT ASSY, ELEV PWR CONT	P	RF
	65-49874-15		UNIT ASSY, AIL. PWR CONT	Q	RF
	65-49874-28		UNIT ASSY, AIL. PWR CONT	R	RF
	65-49874-29		UNIT ASSY, AIL. PWR CONT	S	RF
	65-49874-30		UNIT ASSY, AIL. PWR CONT	T	RF
	65-49874-32		UNIT ASSY, AIL. PWR CONT	U	RF
	65-49874-34		UNIT ASSY, AIL. PWR CONT	V	RF
	65-49874-37		UNIT ASSY, AIL. PWR CONT	W	RF
	65-49874-38		DELETED		
	65-49874-39		UNIT ASSY, AIL. PWR CONT	X	RF
	65-49874-40		UNIT ASSY, AIL. PWR CONT	Y	RF
	65-49874-43		UNIT ASSY, AIL. PWR CONT	Z	RF
	65-49874-44		UNIT ASSY, AIL. PWR CONT	BA	RF
	65-49874-47		UNIT ASSY, AIL. PWR CONT	CA	RF
	65-49874-48		UNIT ASSY, AIL. PWR CONT	DA	RF
	65-49874-49		UNIT ASSY, AIL. PWR CONT	EA	RF
	65-49874-50		UNIT ASSY, AIL. PWR CONT	FA	RF
	65-49874-52		UNIT ASSY, AIL. PWR CONT	GA	RF
	65-49874-54		UNIT ASSY, AIL. PWR CONT	HA	RF
1	MS21902-4		. UNION		1
2	NAS1612-4		. PACKING, O-RING		1
3	MS21902D6		. UNION		1
4	NAS1612-6		. PACKING, O-RING		1
5	65-44761-8		. POWER CONT UNIT ASSY, AIL./ELEV (OPT)	A	1
5	65-44761-8		. POWER CONT UNIT ASSY, AIL./ELEV	Q	1
5	65-44761-9		. POWER CONT UNIT ASSY, AIL./ELEV	AR	1
-5	65-44761-10		. POWER CONT UNIT ASSY, AIL./ELEV	BS	1
-5	65-44761-11		DELETED		
-5	65-44761-12		. POWER CONT UNIT ASSY, AIL./ELEV	CFTW	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1107-					
5	65-44761-14		. POWER CONT UNIT ASSY, AIL./ELEV	DEUV	1
5	65-44761-15		. POWER CONT UNIT ASSY, AIL./ELEV (OPT)	CFTW	1
5	65-44761-16		. POWER CONT UNIT ASSY, AIL./ELEV	GJYBA	1
5	65-44761-17		. POWER CONT UNIT ASSY, AIL./ELEV	HIXZ	1
5	65-44761-18		. POWER CONT UNIT ASSY, AIL./ELEV	K CA	1
5	65-44761-19		. POWER CONT UNIT ASSY, AIL./ELEV	MP FA HA	1
5	65-44761-20		. POWER CONT UNIT ASSY, AIL./ELEV	NO EA FA	1
5	65-44761-21		. POWER CONT UNIT ASSY, AIL./ELEV (OPT)	L DA	1
5	65-44761-22		. POWER CONT UNIT ASSY, AIL./ELEV (OPT)	L DA	1
-6	MS27295-2		. C AP (USE ON 65-44761-9 IF NO WIRE BUNDLE PROVIDED)	AR	AR

- ITEM NOT ILLUSTRATED

VENDORS

V05228 PTI TECHNOLOGIES, INC., 501 DEL NORTE BLVD., OXNARD, CALIFORNIA 93030-7983
FORMERLY PUROLATOR INC., AEROSPACE DIV
FORMERLY IN NEWBURY PARK, CALIFORNIA

V05574 VIKING ELECTRONICS, INC., 5455 ENDEAVOUR CT., MOORPARK, CALIFORNIA 93021-1712
FORMERLY IN CHATSWORTH, CALIFORNIA

V14818 PUROFLOW CORP., 26235 TECHNOLOGY DRIVE, VALENCIA, CALIFORNIA 91355-1147
FORMERLY IN SANTA MONICA, CALIFORNIA

V18350 PALL AEROPOWER CORPORATION, 10540 RIDGE RD., NEW PORT RICHEY, FLORIDA 34654-5198
FORMERLY AIRCRAFT POROUS MEDIA, INC.
FORMERLY IN PINELLAS PARK, FLORIDA

V18426 DYNA-BAK, INC., 4609 70TH AVE E., TACOMA, WASHINGTON 98401
4609 70TH AVE. E.
TACOMA, WASHINGTON 98401

VENDORS (CONT)

V21335	TIMKEN US CORPORATION, 336 MECHANIC STREET, LEBANON, NEW HAMPSHIRE FORMERLY TEXTRON, INC., FAFNIR BEARING DIV. FORMERLY IN NEW BRITAIN, CONNECTICUT
V21550	Replaced: [V21550] BRUNSWICK CORP., SEE WINTEC-TECHNETICS DIVN., V05CK7 by Code: Name and Address below V05CK7: WINTEC LLC, 1681 MCGAW AVE., IRVINE, CALIFORNIA 92614-5631 FORMERLY BRUNSWICK CORP., WINTEC - TECHNECTICS DIV., V21550
V22863	KAVLICO CORPORATION, 14501 PRINCETON AVE., MOORPARK, CALIFORNIA 93021-1484
V72902	Replaced: [V72902] PALMETTO INC SEE: V5F573 by Code: Name and Address below V5F573: GREENE TWEED & CO. INC., 2075 DETWILER ROAD, KULPSVILLE, PENNSYLVANIA 19443-0305 FORMERLY PALMETTO, INC., V72902
V75250	Replaced: [V75250] ABEX CORP SEE AEROSPACE DIV., V93835 by Code: Name and Address below V93835: PARKER HANNIFIN CORPORATION, 2220 PALMER AVENUE, KALAMAZOO, MICHIGAN 49001-4165 FORMERLY ABEX CORP., AEROSPACE DIV., OXNARD CA, V75250
V77896	REXNORD INDUSTRIES, INC., DIV. BEARING OPERATION, 2400 CURTISS ST., DOWNERS GROVE, ILLINOIS 60515-4037
V80756	KAYDON CORP., 29 CASSENS CT., FENTON, MISSOURI 63026-6254
V81321	Replaced: [V81321] PUROLATOR PRODUCTS, INC., V64829 by Code: Name and Address below V64829: ARVINMERITOR, INC., 155 FRANKLIN RD STE 160, BRENTWOOD, TENNESSEE 37027-1614 FORMERLY PUROLATOR PRODUCTS, INC., V81321
V81873	H R TEXTRON, INC., DBA CADILAC GAGE, 25200 RYE CANYON RD., SANTA CLARITA, CALIFORNIA 91355-1265
V92003	PARKER HANNIFIN CORPORATION, DIV. AEROSPACE GROUP HEADQUARTERS, 14300 ALTON PARKWAY, IRVINE, CALIFORNIA 92618-1898
V93835	PARKER HANNIFIN CORPORATION, DBA HYDRAULIC SYSTEMS DIVISION, 2220 PALMER AVENUE, KALAMAZOO, MICHIGAN 49001-4165 FORMERLY NWL CONTROLS SYSTEMS
V94697	MOOG, INC., SENECA ST AT JAMISON RD., EAST AURORA, NEW YORK 14052-0018

VENDORS (CONT)

V97820	Replaced: [V97820] SHAMBAN POLYMER TECH GROUP SEE V09257 by Code: Name and Address below V09257: BUSAK SHAMBAN, INC., RAY CRISTMAN GSG 2531 BREMER ROAD, FORT WAYNE, INDIANA 46803-3014 FORMERLY SHAMBAN POLYMER TECH GROUP V97820 FORMERLY IN NEWBURY PARK, VENTURA
V99643	EATON CORPORATION, 4690 COLORADO BLVD., LOS ANGELES, CALIFORNIA 90039-1106 FORMERLY STERER ENG. AND MFG. CO.

Part No.	Fig. and Index No.	Qty. per Assy.
AC4638E1	1101-42	1
AC4638E11	1101-42	1
AC4638E3	1101-48	1
AC4638E31	1101-48	1
AC8818E1	1101-42	1
AC8818E2	1101-48	1
AN500AD4-5		AR
AN507C632-5		AR
AN507C632R6		AR
AN960C416		AR
A71882	1101-11	1
BACB10AR5	1101-28	1
BACB10A28	1101-36	1
BACB10A28DDH	1101-35	1
BACB30CW4H6	1101-64	4
BACB30DX8-19	1101-72	1
BACB30FD4H8	1101-14	4
BACB30FD5H14	1101-54	4
BACB30LE4HK8	1101-14	4
BACB30LE5HK14	1101-54	4
BACB30MT4HT6	1101-64	4
BACB30US4K6H	1101-64	4
BACB30US4P6H	1101-64	4
BACC45FN12-12P	1106-30	1
BACN12A3MJ	1101-5	1
BACP11W212	1101-38	1
BACP20AX15DA	1103-7	1
BACP20AX15DAP	1103-8	1
BACP20AX18D	1106-32	7
BACP20AX18D	1106A-5	4
BACP20AX25DA	1106A-15	1
BACP20AX25DAP	1106A-10	1
BACP20AX25DAX	1106A-15	1
BACP20AX18DP	1106-31	7
BACP20AX18DP	1106A-1	4
BACR12AT212	1101-37	1
BACR12BD212NA	1101-37	1
BACR12BJ210A	1101-75	1
BACR12BJ210A	1101-88	1
BACR12BM012	1101-43	2
BACR12BM012	1101-62	2
BACR12BM111	1101-122	2
BACR12BM112	1101-124	8
BACR12BM113	1101-135	10
BACR12BM114	1101-59	2
BACR12BM116	1101-16	1
BACR12BM116	1101-49	2
BACR12BM117	1101-120	2

Part No.	Fig. and Index No.	Qty. per Assy.
BACR12BM119	1101-132	2
BACR12BM218	1101-77	
BACR12BM218	1101-90	2
BACR12BM219	1101-40	2
BACR12BM233	1101-46	2
BACR12BM229	1101-32	1
BACS34A5	1101-73	1
BACS34A5	1101-86	1
BP-S-P	1101-28	1
DBPRS02-1492X111	1101-79	AR
DBPRS02-1492X111	1101-92	AR
GM502100-1	1101-52	1
JETA1875500D	1106A-20	1
JETX0527100B	1106A-20	1
JETX0527200B	1106A-20	1
MKSP5E9104	1101-28	1
MKSP5E9104A	1101-28	1
MS16998-42		AR
MS16998-45		AR
MS16998-48		AR
MS20002C4		AR
MS20002C5		AR
MS20004A14		AR
MS20426D4-22		AR
MS20426D4-8		AR
MS21209C0615		AR
MS21209F1-15		AR
MS21209F4-15		AR
MS21209F4-20		AR
MS21209F5-15		AR
MS21232-10		AR
MS21902-4		AR
MS21902D6		AR
NAS1080R8		AR
NAS1193-4C		AR
NAS1351-4H10P		AR
NAS1351-4H12P		AR
NAS1351-4H16P		AR
NAS1351-4H28P		AR
NAS1351-4-20		AR
NAS1611-010		AR
NAS1611-012		AR
NAS1611-013		AR
NAS1611-111		AR
NAS1611-112		AR
NAS1611-113		AR
NAS1611-114		AR

Part No.	Fig. and Index No.	Qty per Assy
NAS1611-116		AR
NAS1611-117		AR
NAS1611-119		AR
NAS1611-123		AR
NAS1611-210		AR
NAS1611-212		AR
NAS1611-213		AR
NAS1611-218		AR
NAS1611-219		AR
NAS1611-222		AR
NAS1611-223		AR
NAS1611-229		AR
NAS1612-4		AR
NAS1612-6		AR
NAS679C4W		AR
NAS813-14		AR
S12766-012	1101-43	2
S12766-012	1101-62	2
S12766-111	1101-122	2
S12766-112	1101-124	8
S12766-113	1101-135	10
S12766-114	1101-59	2
S12766-116	1101-16	1
S12766-116	1101-49	2
S12766-117	1101-120	2
S12766-119	1101-132	2
S12766-123	1102-3	2
S12766-218	1101-77	2
S12766-218	1101-90	2
S12766-219	1101-40	2
S12766-223	1101-46	2
S12766-229	1101-32	1
S32953	1101-74A	1
S32953	1101-88	1
S34852-210H5	1101-74A	1
S34852-210H5	1101-88	1
S40474	1101-79	1
S40474	1101-92	1
UR50	1104-3	1
UR50	1106-11	1
UR50	1106-18	1
UR501	1106-25	1
UR50	1106-4	1
UR50S	1104-3	1
UR50S	1106-11	1
UR50S	1106-18	1
UR50S	1106-25	1

Part No.	Fig. and Index No.	Qty per Assy
UR50S	1106-4	1
000100-0113	1104-4	1
000100-0113	1106-10	1
000100-0113	1106-17	1
000100-0113	1106-24	1
000100-0113	1106-3	1
000101-0172	1104-2	1
0893701	1101-11	1
10-60808-1	1101-42	1
10-60808-2	1101-48	1
10-60808-3	1101-42	1
10-60808-4	1101-48	1
10-60809-1	1101-61	1
10-60811-1	1101-7	1
10-60811-3	1101-7	1
10-60811-8	1101-7	1
10-60811-9	1101-7	1
10-60811-13	1101-7	1
10-60813-1	1101-1	1
11-10106	1101-42	1
11-10107	1101-48	1
21-10033	1101-48	1
21-10034	1101-42	1
21-11175	1101-42	1
21-11176	1101-48	1
242610-1	1106-37	1
242610-2	1106-37	1
242610RW1	1106-37	1
242610RW1-1	1106-37	1
242610RW1-3	1106-37	1
242611-1	1101-85	1
242611-3	1101-85	1
242615-1	1101-81	1
242615-3	1101-81	1
242615-9	1101-84	1
242615-11	1101-82	2
242615-13	1101-82	2
242615-19	1101-83	1
2426155-21	1101-83	1
242621RW1	1106A-50	1
242621RW1-1	1106A-50	1
242621RW1-3	1106A-50	1
2720C	1101-61	1
4228-633	1101-48	1
4228-634	1101-42	1

Part No.	Fig. and Index No.	Qty. per Assy
4245-501	1101-42	1
4245-502	1101-48	1
45080	1101-7	1
45080-1	1101-7	1
595-21000-952-0190	1101-88	1
596N21401-952-0170	1101-81	1
596N21401-952-0190	1101-81	1
596N21401-952-0191	1101-81	1
596N21401-952-0192		
59600-5011	1101-7	1
59600-5003	1101-7	1
59600-5007	1101-7	1
59800-5001	1106-61	1
60B80034-1	1101-42	1
60B80034-2	1101-48	1
65-44583-10	1101-107	1
65-44583-10	1101-111	1
65-44583-10	1101-84	1
65-44583-13	1101-82	2
65-44583-14	1101-83	1
65-44583-17	1101-109	2
65-44583-18	1101-110	1
65-44583-19	1101-105	2
65-44583-2	1101-81	1
65-44583-20	1101-106	1
65-44583-26	1104-110	1
65-44583-27	1104-109	2
65-44583-28	1104-106	1
65-44583-29	1104-105	2
65-44583-4	1101-108	1
65-44583-5	1103-104	1
65-44583-8	1101-108	1
65-44583-9	1101-104	1
65-44661-1	1103-6	1
65-44661-1	1103-6A	1
65-44661-1	1103-6B	1
65-44662-1	1103-2	1
65-44663-1	1101-22	1
65-44664-1	1101-23	1
65-44665-1	1101-113	1
65-44665-2	1101-118	1
65-44665-4	1101-115	1
65-44666-1	1101-85	1
65-44667-1	1101-139	1
65-44667-2	1101-139	1
65-44667-3	1101-139	1
65-44667-4	1101-139	1
65-44668-1	1101-128	1
65-44668-2	1101-28	1
65-44668-3	1101-28	1
65-44668-4	1101-28	1
65-44671-1	1102-10	1
65-44671-2	1102-13	1
65-44671-3	1102-10	1
65-44671-4	1102-13	1
65-44671-7	1102-10	1
65-44671-8	1102-13	1
65-44673-1	1101-85	1
65-44761-10	1101	RF
65-44761-10	1107-5	1
65-44761-12	1101	RF
65-44761-12	1107-5	1
65-44761-14	1101	RF
65-44761-14	1107-5	1
65-44761-15	1101	RF
65-44761-15	1107-5	1
65-44761-18	1101	RF
65-44761-18	1107-5	1

Part No.	Fig. and Index No.	Qty. per Assy
65-44761-19	1101	RF
65-44761-19	1107-5	1
65-44761-20	1101	RF
65-44761-20	1107-5	1
65-44761-21	1101	RF
65-44761-21	1107-5	1
65-44761-22	1101	RF
65-44761-22	1107-5	1
65-44761-8	1101	RF
65-44761-8	1107-5	1
65-44761-9	1101	RF
65-44761-9	1107-5	1
65-44773-1	1101-85	1
65-44814-1	1101-138	1
65-44814-2	1101-138	1
65-44814-3	1101-138	1
65-44814-4	1101-138	1
65-44826-1	1102-11	1
65-44826-2	1102-11	1
65-44826-3	1102-11	1
65-44826-4	1102-11	1
65-44826-5	1102-11	1
65-44828-2	1101-18	1
65-44828-2	1102	RF
65-44828-4	1101-18	1
65-44828-4	1102	RF
65-44832-1	1102-14	1
65-44832-2	1102-14	1
65-44832-3	1102-14	1
65-44833-1	1102-12	1
65-44833-2	1102-12	1
65-44833-3	1102-12	1
65-44833-4	1102-12	1
65-44834-1	1101-67	1
65-44834-2	1101-69	1
65-44835-1	1106-37	1
65-44835-11	1106-37	1
65-44835-3	1106-37	1
65-44835-4	1106-37	1
65-44835-7	1106-37	1
65-44835-9	1106-37	1
65-44836-1	1101-140	1
65-44836-1	1106	RF
65-44836-10	1106-20	1
65-44836-11	1106-21	1
65-44836-12	1106-22	1
65-44836-13	1106-23	1
65-44836-14	1106-27	1
65-44836-15	1106-28	1
65-44836-16	1106-12	4
65-44836-16	1106-19	4
65-44836-16	1106-26	2
65-44836-16	1106-5	4
65-44836-17	1101-140	1
65-44836-17	1106	RF
65-44836-18	1101-140	1
65-44836-18	1106	RF
65-44836-19	1101-140	1
65-44836-19	1106	RF
65-44836-2	1106-6	1
65-44836-3	1106-7	1
65-44836-4	1106-8	1
65-44836-5	1106-9	1
65-44836-6	1106-13	1
65-44836-7	1106-14	1
65-44836-8	1106-15	1
65-44836-9	1106-16	1
65-44837-1	1104-13	1
65-44838-1	1102-15	1
65-44838-3	1102-15	1
65-44838-4	1102-15	1
65-44838-5	1102-15	1
65-44845-10	1101-140	1
65-44845-10	1106A	RF
65-44845-11	1101-140	1
65-44845-11	1106A	RF
65-44845-13	1106A-50	1
65-44845-14	1101-140	1
65-44845-14	1106A	RF
65-44845-15	1101-140	1
65-44845-15	1106A	RF
65-44845-16	1101-140	1
65-44845-16	1106A	RF
65-44845-17	1106A-55	1
65-44845-18	1106A-50	1
65-44845-4	1106A-50	1
65-44845-5	1106-140	1
65-44845-5	1106A	RF
65-44845-7	1106A-50	1
65-44845-9	1106A-50	1
65-44847-1	1101-56A	1
65-44847-1	1104	RF
65-44847-2	1104-13	1
65-44847-3	1101-56A	1

Part No.	Fig. and Index No.	Qty. per Assy
65-44847-3	1104	RF
65-44847-4	1104-13	1
65-45180-13	1107	RF
65-45180-18	1107	RF
65-45180-19	1107	RF
65-45180-2	1107	RF
65-45180-22	1107	RF
65-45180-23	1107	RF
65-45180-27	1107	RF
65-45180-29	1107	RF
65-45180-30	1107	RF
65-45180-31	1107	RF
65-45180-34	1107	RF
65-45180-35	1107	RF
65-45180-4	1107	RF
65-45180-5	1107	RF
65-45180-7	1107	RF
65-49874-15	1107	RF
65-49874-28	1107	RF
65-49874-29	1107	RF
65-49874-30	1107	RF
65-49874-32	1107	RF
65-49874-34	1107	RF
65-49874-37	1107	RF
65-49874-39	1107	RF
65-49874-40	1107	RF
65-49874-43	1107	RF
65-49874-44	1107	RF
65-49874-47	1107	RF
65-49874-48	1107	RF
65-49874-49	1107	RF
65-49874-50	1107	RF
65-49874-52	1107	RF
65C30861-1	1106-37	1
65C30861-1	1106A-50	1
65-49874-54	1107	RF
66-22790-1	1101-74	1
66-22790-1	1101-87	1
66-22791-1	1103-1	1
66-22791-2	1103-1	1
66-22791-3	1103-1	1
66-22792-1	1101-29	2
66-22792-2	1101-29	AR
66-22792-3	1101-29	AR
66-22792-4	1101-29	AR
66-22793-1	1101-116	1
66-22793-2	1101-116	1

Part No.	Fig. and Index No.	Qty. per Assy
66-22796-1	1101-134	1
66-22798-1	1101-30	1
66-22799-1	1101-129	1
66-22801-1	1101-126	1
66-22802-1	1101-96	1
66-22803-1	1101-97	1
66-22804-1	1106-2	1
66-22805-1	1106-1	1
66-22806-1	1101-114	1
66-22813-1	1102-6	1
66-22832-1	1102-1	1
69-20184-1	1101-8	1
69-20185-1	1101-12	1
69-35587-3	1101-4	1
69-35653-1	1103-5	1
69-35654-1	1102-2	1
69-35656-1	1102-9	1
69-35659-1	1104-10	2
69-35660-1	1101-56	1
69-35660-1	1104	RF
69-35660-2	1104-6	1
69-35660-3	1104-7	1
69-35660-4	1104-8	1
69-35660-5	1104-9	1
69-35660-6	1104-5	8
69-35661-1	1101-15	1
69-35662-1	1101-137	1
69-35662-2	1101-137	1
69-35663-1	1101-31	1
69-35664-1	1103-4	1
69-35665-1	1101-34	1
69-35665-1	1103	RF
69-35665-2	1103-3	1
69-35665-3	1101-34	1
69-35665-3	1103	RF
69-35665-4	1101-34	1
69-33655-4	1103	RF
69-33655-5	1103-3A	1
69-33655-6	1101-34	1
	1103	RF
69-33655-7	1101-34	1
	1103	RF
69-35666-1	1101-21	1
69-35667-1	1101-58	1
69-35668-1	1101-94	1
69-35669-1	1101-102	1
69-35670-1	1101-112	1

Part No.	Fig. and Index No.	Qty. per Assy
69-35686-1	1101-66	1
69-35687-1	1101-80	1
69-35687-1	1101-93	1
69-35688-1	1101-39	1
69-35689-1	1101-45	1
69-35690-1	1101-131	1
69-35692-1	1101-119	1
69-35693-1	1101-127	1
69-35693-2	1101-127	1
69-35693-3	1101-127	1
69-35693-4	1101-127	1
69-35694-1	1101-99	1
69-35695-1	1101-130	1
69-35698-1	1102-7	1
69-35699-1	1101-117	1
69-35772-1	1101-24	3
69-35774-1	1102-5	1
69-35775-1	1102-8	1
69-35811	1101-103	1
69-54599-1	1101-61	1
69-54744-1	1101-11A	1
69-54744-2	1101-7A	1
69-54744-3	1101-52A	1
69-54781-1	1106A-30	1
69-54781-2	1106A-30	1
69-77393-1	1106A-60	1
69-78445-1	1103-5A	1
712B5MR1952N	1101-79	1
721S4MT952T	1101-81	1
721T4MT952T	1101-81	1
7210FT952T	1101-74A	1
7210FT952T	1101-88	1
7214MT952T	1101-81	1
73016	1101-11	1
7500271	1101-42	1
7500272	1101-48	1
75130	1101-11	1
7553574	1101-42	1
7553575	1101-48	1
955235-4	1101-2	1
955235-6	1101-3	1

Part No.	Fig. and Index No.	Qty. per Assy