TO: ALL HOLDERS OF COMPUTER ASSEMBLY OVERHAUL MANUAL, 27-09-31

REVISION NO. 20, DATED JUL 1/06

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
Updated cleaning materials in Cleaning and Repair sections			X		X								

COMPUTER ASSEMBLY

27-09-31

BOEING P/N 65-45132-5, -7, -8, -9, -10, -11, -12

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30426	May 15/68
27-1014		PRR 31077	Aug 15/69
		PRR 31851	Jun 10/70
		PRR 31851-1	Jun 10/70
27-1038			Mar 10/71
27-1062		PRR 32304	Dec 25/73

LIST OF EFFECTIVE PAGES

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

	PAGE	DATE		PAGE	DATE		PAGE	DATE
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*	LEP-1	Jul 1/06		512	Jun 5/87		801	Nov 15/68
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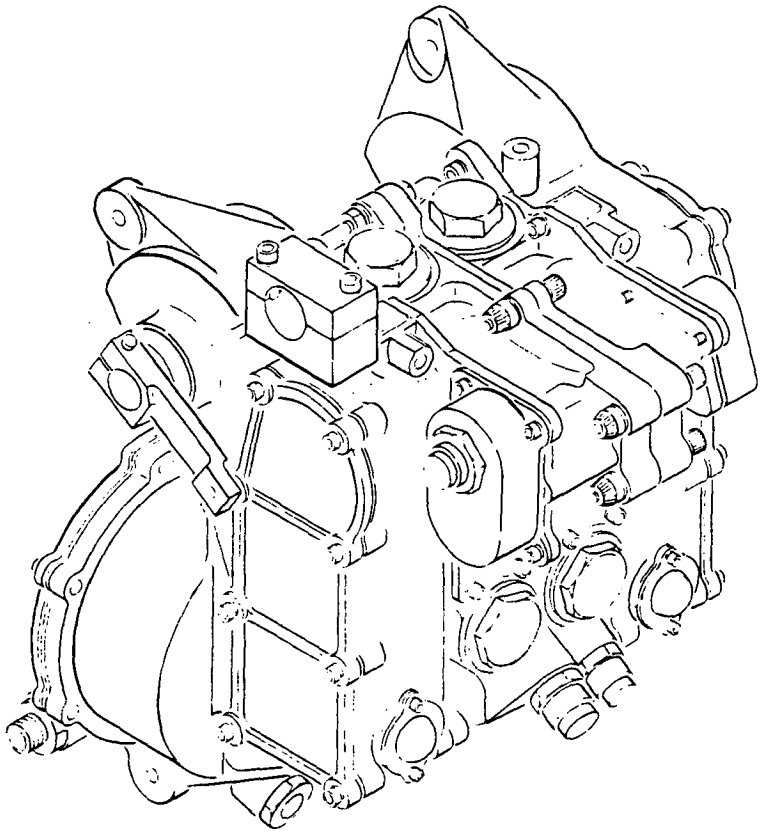
COMPUTER ASSEMBLY



Computer Assembly
Figure 1

DESCRIPTION AND OPERATION

1. The computer assembly is an enclosed, sealed unit consisting of a bellows housing, bellows and caps, covers, mechanical components to transmit movement of the bellows, hydraulic control components, and pressure differential switch (Fig. 2).

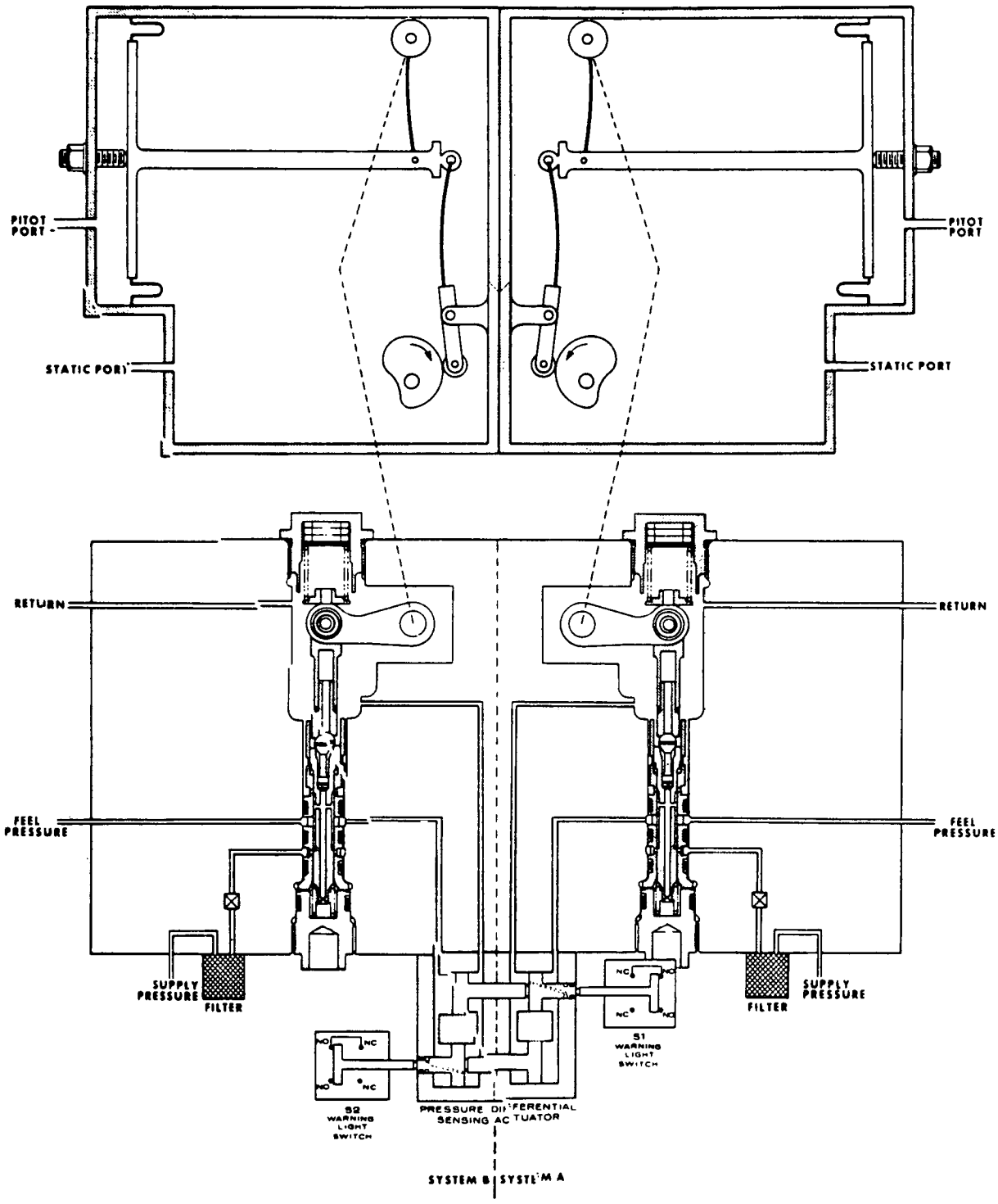
2. The computer senses and provides a monitor of system A and system B feel pressures. If the feel pressures differ by approximately 25% or more of the higher pressure, the pressure differential switch closes the monitor circuit in the airplane system.

3. Pitot air pressure on the computer assembly bellows opposes static air pressure on the other side of the bellows to develop a differential bellows force dependent on the airspeed and altitude of the airplane. The differential force moves the bellows by deflecting the "Q" input spring which transmits a force to a force balance valve assembly. This force positions the valve to supply feel pressure through the feel pressure ports to the elevator and rudder control units (Fig. 2, 3).

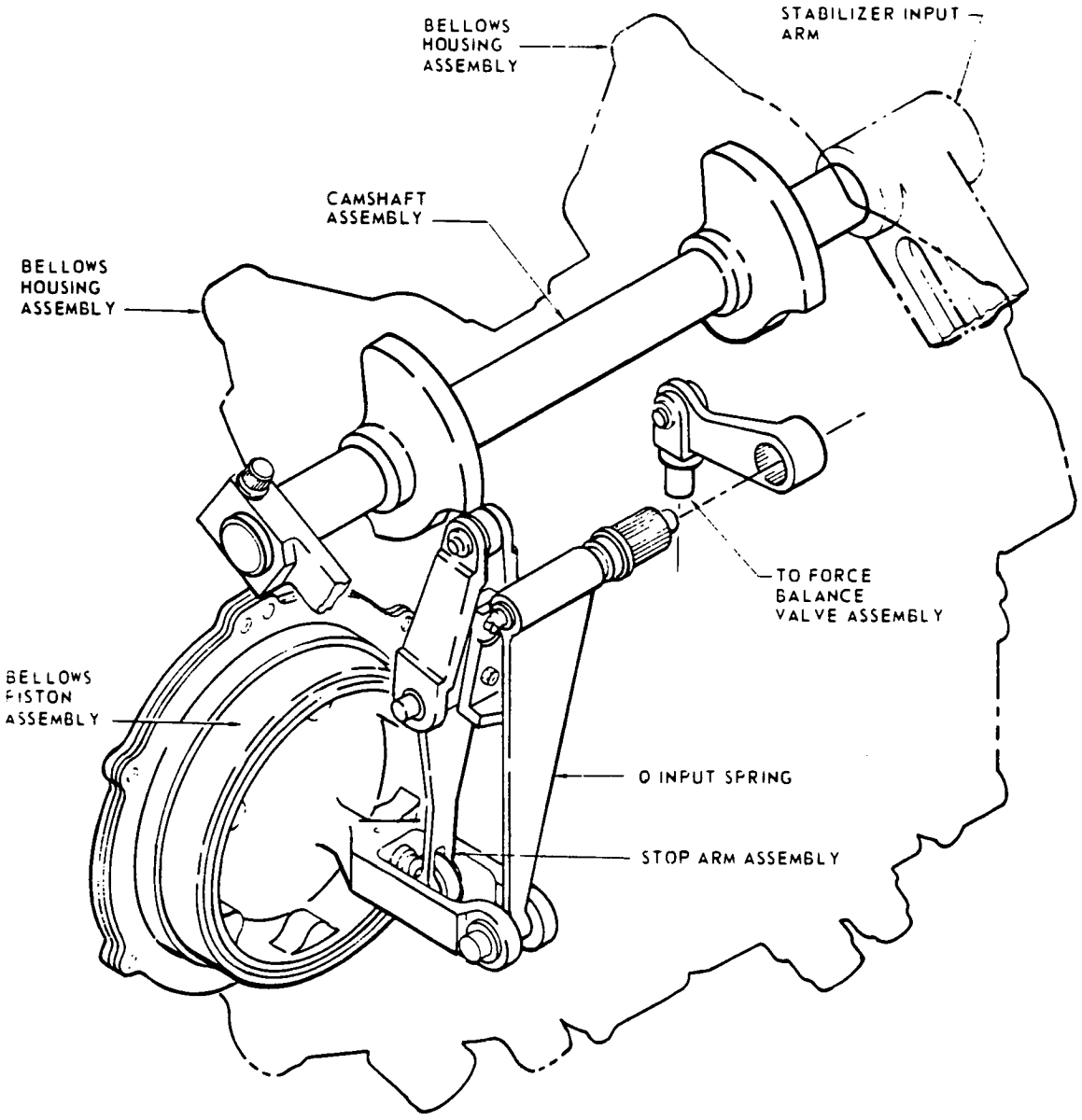
4. The stabilizer input arm is coupled to the stabilizer for positioning the stabilizer camshaft assembly. Rotation of the camshaft assembly positions a stop arm assembly in the bellows housing assembly. The position of the stop arm in the bellows housing assembly determines the upper limit of feel pressure for each stabilizer input arm position. As the pitot pressure increases, the feel pressure increases rapidly until the bellows piston assembly contacts the stop arm assembly. On contacting the stop arm assembly, the bellows force must overcome the spring force of the stop arm as well as that of the "Q" input spring; therefore, the feel pressure increases at a less rapid rate (Fig. 2, 3).

5. Leading Particulars

Operating Fluid -- BMS 3-11 hydraulic fluid
Operating Feel Pressure Range -- 200 ± 20 to 2100 ± 105 psi
Weight (dry) -- 22 lbs. approx
Proof Pressure
    Pressure ports -- 4500 psi
    Feel pressure ports -- 4500 psi
    Return ports -- 3000 psi
    Housing -- 20 in. Hg
    Pitot air pressure -- 20 in. Hg
Burst Pressure
    Pressure ports -- 9000 psi
    Feel pressure ports -- 7500 psi
    Return ports -- 4500 psi
    Housing -- 20 psi
    Pitot air pressure -- 20 psi
Ambient operating temperature range -- -40°F to +160°F
Fluid operating temperature range -- -40°F to +160°F
Altitude -- Sea Level to 50,000 ft.
Physical dimensions
    Height -- 12.3 inches
    Depth -- 8.9 inches
    Width -- 11.6 inches



Computer Assembly Schematic
Figure 2



Computer Assembly Functional Illustration
Figure 3

DISASSEMBLY

1. General

   A. Prior to disassembly, remove all identification seals and lockwire.

2. Disassembling Computer Assembly (Fig. 1101)

   A. Remove screws (3), washers (4) and O-rings (5) securing covers (1 and 2) on housing assemblies (106) and (107).

   B. Remove covers (1) and (2).

   C. Remove screws (66) and washers (67) securing covers (65) on housing assemblies (106, 107).

   D. Remove covers (65).

   E. Remove unions (7) from both pitot ports in bellows caps (9). Remove O-rings (8) from unions (7).

   F. Remove static fittings (72) from housing assemblies (102) and (103). Remove O-rings (73) from static fittings (72).

   G. Remove screws (100) and washers (101) securing potentiometer clamp (99). Remove potentiometer clamp (99) from housing assembly (106).

   H. On 65-45132-5, -7, -8, -9, assemblies remove screw (75) and washer (76). Remove potentiometer drive arm (74) from cam shaft (82).

   I. Remove arm assembly, stab spring (49) as follows:

      (1) Remove end of preload springs (40) from holes in housing assemblies (106, 107). Disconnect and remove preload springs (40) from preload spring brackets (42) and (43).

      (2) Remove pivot shafts (41) securing arm assemblies (49) and cam follower arm assemblies (57).

      (3) Remove cam follower arm assemblies (57) from housing assemblies (106, 107).

      (4) Remove arm assemblies (49) from housing assemblies (106, 107).

J. Disassemble arm assemblies (49).

(1) Remove nuts (47), washers (48) and screws (46).

(2) Remove screws (44) and washers (45) and remove preload spring brackets (43) and (42) from arm assemblies (49).

K. Remove two bearings (56) from housing assembly (107) and from housing assembly (106).

L. Remove nut (69), washer (70) and screw (71) from housing assemblies (106, 107).

M. Remove camshaft assembly (81).

NOTE: Camshaft assembly (81) which includes camshaft (82), cam (87) and cam (86), is a matched set and should be maintained as such.

(1) Remove retainer (79) from housing assembly (102).

(2) Remove bearing (92) and retainer seal (93) from housing assembly (106).

CAUTION: DO NOT PERMIT INPUT ARM TO ROTATE AGAINST INTERNAL STOPS WHEN PLUG (96) IS REMOVED OR DAMAGE TO UNIT MAY OCCUR.

(3) Restrain input arm (98) to prevent contact with internal stops and remove plug (96) and washer (97) from end of camshaft (82). Remove shipping sleeve or arm assembly (98).

(4) Remove retainer (80) from housing assembly (107).

(5) Remove bearing (88) and retainer seal (89) from housing assembly (107).

(6) Remove cotter pins (77) securing shear pins (78).

(7) Remove shear pins (78) from cams (86) and (87).

(8) Hold large end of camshaft (82) and pull camshaft from the housing assemblies (106, 107). Remove cam (86) and cam (87) as camshaft (82) is removed from housings (106, 107).

(9) Remove cap ring (91) and packing (90) from housing assembly (107).

(10) Remove cap ring (95) and packing (94) from housing assembly (106).

N. Remove bellows assemblies (23) as follows:

NOTE: Removal procedures for system A side and system B side are identical.

(1) Remove screws (10) and washers (11) securing bellows cap (9). Remove bellows cap (9), gasket (12) and bellows guide (13).

(2) Remove nut (22), washers (21) and bolt (20) attaching rod end of bellows assembly (23) to "Q" spring (37).

(3) Remove bellows assembly (23) from housing.

O. Disassemble bellows assemblies (23) as follows:

NOTE: Disassembly procedures for system A side and system B side are identical.

(1) Remove screws (24) and washers (25) securing piston cap (26) to bellows piston assembly (30).

(2) Remove piston cap (26) and diaphragm (27).

(3) Remove lockwire from guide rod (28).

(4) Remove guide rod (28) and washer (29) from bellows piston assembly (30).

P. Disassemble bellows cap (9) as follows:

NOTE: Disassembly procedures for system A side and system B side are identical.

(1) Remove nut (14) and washer (15) from fitting assembly (16).

(2) Remove fitting assembly (16) from bellows cap (9).

(3) Remove O-ring (19) from fitting assembly (16).

Q. Remove screws (38) and washers (39) from Q spring shafts (61, Fig. 1102).

R. Remove Q springs (37) from Q spring shafts (61, Fig. 1102).

S. Disassemble housing assembly (107) from hydraulic housing assembly (122) as follows:

(1) Remove screw (102) and sealing washer (103) or washer (103A) and packing (103B).

(2) Remove screws (104) and washers (105).

T. Remove cam shaft sleeve (116) from housing assembly (106).

U. Remove two O-rings (117) from cam shaft sleeve (116).

V. Disassemble housing assembly (106) from hydraulic housing assembly (122). Repeat step S.

W. Remove O-rings (120) and (121) from each side of hydraulic housing assembly (122).

3. Disassemble Hydraulic Control Assembly (Fig. 1102.)

A. Remove reducer (18) from hydraulic housing (112) system A.

B. Remove reducers (18) from hydraulic housing (112) system B.

NOTE: Two caps (14) and four caps (17) are for storage and shipping purposes only.

C. Remove O-rings (19) and caps (17) from reducers (18).

D. Remove reducer (15) from each hydraulic housing (112). Remove O-rings (16) and caps (14) from reducers (15).

E. Remove union (12) from hydraulic housing (112). Remove O-ring (13) and cap (11) from union (12).

F. Remove screws (7) and washers (8) securing plug seals (6) in each hydraulic housing (112). Remove plug seals (6). Remove O-rings (9) and backup rings (10) from each plug seal (6).

G. Remove filter (3) from each hydraulic housing (112) as follows:

(1) Remove filter retainer (1) from hydraulic housing (112).

(2) Remove O-ring (2) from filter retainer (1).

(3) Remove filter (3) from housing (112).

(4) Remove O-ring (4) and backup rings (5) from filter (3).

H. Remove wiring as follows:

(1) Remove screws (21) and washers (22) securing cover (20) on hydraulic housing (112). Remove cover (20).

(2) Remove screws (29) and washers (30) securing cover (28) on hydraulic housing (112). Remove cover (28).

(3) Remove dust cap (27) if necessary from connector (31).

(4) Remove connector nut from connector (31) and remove connector from cover (28).

(5) Unsolder and remove wire from pins of connector (31).

(6) Remove shrink tubing (36) from switch (32, 23) terminals.

(7) Unsolder and remove wire from switch terminals.

(8) Remove lockwire from screws (33) and (24). Remove screws (33) and (24), washers (34) and (25) and nutplate (35) and (26) securing switches (32) and (23) to retainer sleeves (37). Remove switches (32) and (23).

(9) Remove wires and sleeving from wire passage in housing (112).

NOTE: The following procedures (I through S) are applicable to both A and B systems.

I. Remove sleeve and piston assembly (38) as follows:

(1) Remove lockwire from retainer sleeve (37).

(2) Remove retainer sleeve from housing (112).

CAUTION: SLEEVE AND PISTON ASSEMBLY-OUTER (38) IS A PRECISION ASSEMBLY. AVOID ALL UNNECESSARY HANDLING. PARTS AND/OR ASSEMBLIES MUST BE PROTECTED AT ALL TIMES WHEN NOT IN USE BY PLACING IN ADEQUATE CONTAINER. CHECK FOR MATCHED SET (SLEEVE AND PISTON SHOULD BE MARKED WITH SAME SERIAL NUMBER).

(3) Remove sleeve and piston assembly (38) from housing assembly (112).

(4) Remove cap strip (43) and O-ring (42) from piston (40).

(5) Remove backup rings (45) and O-rings (44) from sleeve (41).

J. Remove preload retainer (46) with shims (51) and (50) and spring (49).

K. Remove spring (49), shims (50) and (51) from preload retainer (46).

L. Remove O-ring (47) from preload retainer (46).

M. Remove spring seat (48).

N. Rotate arm clevis assembly (63) to disengage relief plunger (86). Remove relief plunger (86), with adjustment shims (87), (88), (89), and/or (90), from valve poppet (83). Remove adjustment shims from relief plunger (86).

O. Remove valve assembly (80) as follows:

(1) Remove valve retainer (76) from housing assembly (112).

(2) Remove O-ring (77) and backup rings (78) from valve retainer (76).

(3) Remove compression spring (79) from valve slider (82).

CAUTION: VALVE ASSEMBLY (80) IS A PRECISION PART. AVOID ALL UNNECESSARY HANDLING. PART MUST BE PROTECTED AT ALL TIMES WHEN NOT IN USE. SLEEVE (81), AND SLIDER (82) ARE MATCHED SETS AND SHOULD BE MARKED WITH THE SAME SERIAL NUMBER FORMING VALVE ASSEMBLY (80).

(4) Remove valve assembly (80) from hydraulic housing (112).

(5) Remove O-rings (84) and backup rings (85) from valve sleeve (81).

P. Remove screws (53) and washers (54) securing retainer (52).

Q. Remove retainer (52) from Q shaft (61). Remove backup rings (56) and O-ring (55) from outside diameter of retainer (52). Remove bearing (60), seal retainer (59), cap ring (58) and square O-ring (57) from inside diameter of retainer (52).

R. Remove "Q" shaft (61). Remove spacer (74), arm clevis assembly (63) and spring (62) from housing assembly (112) as they are released from "Q" shaft (61).

S. Remove bearing (75) from housing (112).

T. Separate system A and system B hydraulic housing assemblies (112) as follows:

(1) Remove nut (101), washer (102), bolt (100) and washer (103).

(2) Remove nuts (95), washers (96), bolts (94), and washers (97).

(3) Remove nuts (105), washers (106) and bolts (104).

(4) Remove nut (92), washers (93) and bolt (91).

(5) Remove bolt (98) and washer (99).

CAUTION: SLEEVE AND PISTON ASSEMBLIES (107) ARE PRECISION ASSEMBLIES. AVOID ALL UNNECESSARY HANDLING. PARTS AND/OR ASSEMBLIES MUST BE PROTECTED AT ALL TIMES WHEN NOT IN USE. CHECK FOR MATCHED SET. SLEEVE AND PISTON SHOULD BE MARKED WITH SAME SERIAL NUMBER.

U. Remove sleeve and piston assembly (107) from each hydraulic housing (112).

V. Remove backup rings (111) and O-rings (110) from each sleeve and piston assembly (107).

CLEANING

1. Disassembly Cleaning

   A. Wash all metal parts except the following in solvent, Specification P-D-680, or equivalent:

      (1) Piston assembly (30, figure 1101)

      (2) Bearings (52, 56, 60, 88, 92, figure 1101)

      (3) Switches (23, 32, figure 1102)

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

   C. Clean parts, which should not be immersed in solvent, listed in paragraph 1.A., by wiping with a clean lint-free cloth moistened with solvent, Specification P-D-680 or equivalent.

   CAUTION: DO NOT ALLOW SOLVENT TO ENTER BEARINGS.

   D. Dry parts with a clean lint-free cloth or with clean, dry, low pressure air.

   E. Clean filter elements (3, figure 1102) by backwashing with solvent, Specification P-D-680 or equivalent. Use soft bristle brush if necessary. Dry by blowing clean, dry, low pressure air through element.

2. Preassembly Cleaning

   A. Ultrasonically clean all metal parts except bearings, assemblies with bearings, and parts listed in paragraph 1.A., using standard industry practices and SOPM 20-30-01.

   B. Wash and hand rinse bearings and assemblies with bearings, except parts listed in paragraph 1.A., using standard industry practices and SOPM 20-30-01.

   C. Clean diaphragm (27 figure 1101), gaskets (6, 12, 68 figure 1101) and parts listed in paragraph 1.A. by wiping with a clean lint-free cloth moistened with solvent Federal Specification P-D-680 or equivalent.

   D. Wash O-rings, backup rings, and cap strips in BMS 3-11 hydraulic fluid.

INSPECTION/CHECK

1. General

   A. Check all parts (except those listed in Fig. 301) for obvious defects in accordance with standard industry practices. Refer to Fits and Clearances for design dimensions and wear limits.

   B. Discard and replace all parts listed in Fig. 301.

   C. Check electrical connectors per 20-11-02.

2. Magnetic particle examine following parts per 20-20-02.

   A. (Fig. 1101) -- Q-Spring (37), spring (40), arm (50), shaft (85), cams (86, 87)

   B. (Fig. 1102) -- Retainer (1), shaft (61)

3. Penetrant examine following parts per 20-20-01.

   A. (Fig. 1101) -- Brackets (42, 43), arm (58), arm (74). Check housings (115A, 115B) using visible dye method.

   B. (Fig. 1102) -- Plug (6), retainer (46), spring (49), retainer (52), spring (62), retainer (76), spring (79). Check housing (112) using visible dye method.

4. Spring check -- Check springs (40, Fig. 1101), (49, 62, 79, Fig. 1102) per Fig. 302

5. The following hydraulic control components are matched sets. If units are not mechanically damaged, acceptance or rejection is determined during TESTING.

   A. Sleeve and piston assembly (107, Fig. 1102)

   B. Piston and sleeve (40, 41, Fig. 1102)

   C. Sleeve and slider (81, 82, Fig. 1102)

Nomenclature	Figure and Item No.
O-rings	All
Backup Ring	All
Ring Cap	All
Gaskets	All
Diaphragm	1101-27
Screw	1101-38
Bearing	1101-52
Washer	1101-53, 54
Spacer	1101-55
Shear Pin	1101-78
Sealing Washer	1101-97
Pad	1101-115
Switch	1102-23, 32
Cap Strip	1102-43
Nut	1102-92, 105

Discard Parts
Figure 301

Nomenclature (spring)	Free Length (inches)	Spring Rate (pd/inch)	Min Check Load (pound)	Lth Min Check Load (inches)	Max Check Load (pound)	Lth Max Check Load (inches)
Cam Follower, Preload, Tension (1101-40)	1.700	5.58	3.91 ± 0.39	2.40	5.69 + 0.41 - 0.57	2.72
Valve, Preload, Compression (1102-49)	1.328	35.2	6.37 ± 0.64	1.147	18.0 ± 1.80	0.816
Arm, Preload, Compression (1102-62)	1.34	5.64	4.96 ± 0.5	0.448	5.36 ± 0.54	0.377
Valve, Balance Compression (1102-79)	1.040	5.21	2.5 ± 0.25	0.554	3.23 ± 0.32	0.414

Spring Check
Figure 302

REPAIR

1. Repair

A. Remove minor defects such as nicks, scratches, scoring, or burrs using aluminum oxide abrasive cloth, 220 grit or finer. Do not exceed limits in figure 601.

B. Repair defects in threaded areas using a small triangular file, a thread chaser or a fine buffing wheel.

C. Renew lapped parts to stated surface finish, if inspection requirements are exceeded.

CAUTION: DO NOT LAP MORE THAN REQUIRED. LAPPED ASSEMBLIES MUST COMPLY WITH LEAKAGE LIMITS IN PARA. 6.C., 4.A., AND 5.A. OF TESTING SECTION.

D. Refinish polished surfaces as required for corrosion protection. Repair minor surface finish damage on aluminum alloys by applying SRF-2.115.

2. Refinish

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

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

B. Components of computer assembly. (See figure 1101.)

(1) Nut (14), Stop Pin (33), Spring (40), Shaft (41), Screws (71) and (46), and Pin (63) -- Apply F-1.181, thickness 0.0001 to 0.0003 inch, all over.

(2) Guide Rod (28) -- Apply F-1.181, thickness 0.0002 to 0.0004 inch, on surfaces indicated. Apply chromium plate per CVA 5-5e IIB or Subject 20-42-03. Diameter before plating 0.239 to 0.240 inch, after plating 0.245 to 0.246 inch or a minimum thickness of chromium plating of 0.002 inch after grinding per Subject 20-10-04, on surface indicated on figure 401.

(3) Cam Shaft Assembly (85) -- Apply F-1.181, thickness 0.0002 to 0.0004 inch, on surfaces indicated on Fig. 402.

(4) Cams (86 and 97) -- Apply F-1.181, thickness 0.0002 to 0.0004 inch, on surfaces indicated on Fig. 403.

(5) Q-Spring (37) -- Vacuum cadmium plate per MIL-C-8837 class 2 type 1, all over except in 0.1873-inch diameter hole.

(6) Arm (50) -- Vacuum cadmium plate per MIL-C-8837 class 2 type 1, all over except in 0.1895- and 0.2498-inch holes.

(7) Arm (98E) -- Apply F-2.20 plus SRF-12.205, except no primer in bores, on mating surfaces and on splines.

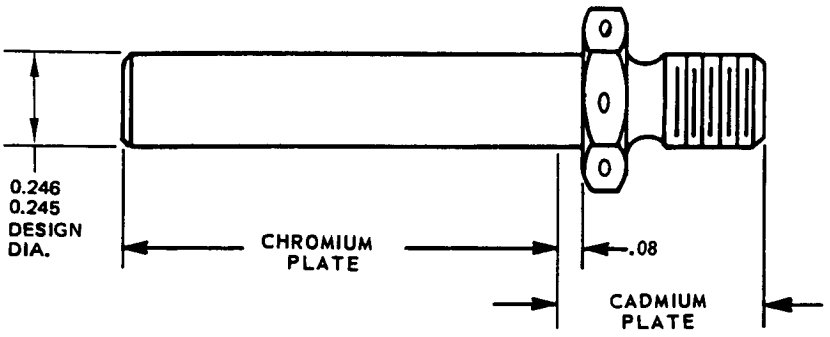
D. Components of hydraulic control assembly (Fig. 1102).

(1) Retainer (1) -- Apply F-1.181, thickness 0.0002 to 0.0004 inch, on surfaces indicated on Fig. 404.

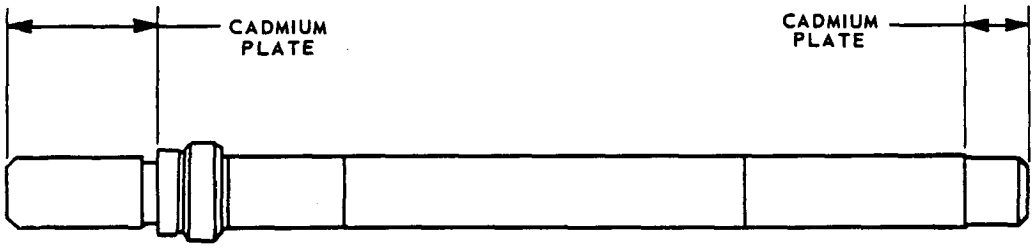
(2) Nut Plate (26) -- Apply F-1.181, thickness 0.0002 to 0.0004 inch, all over.

(3) Q-Shaft (61) -- Apply F-1.181, 0.0002 to 0.0004 inch thickness on surfaces indicated on Fig. 405.

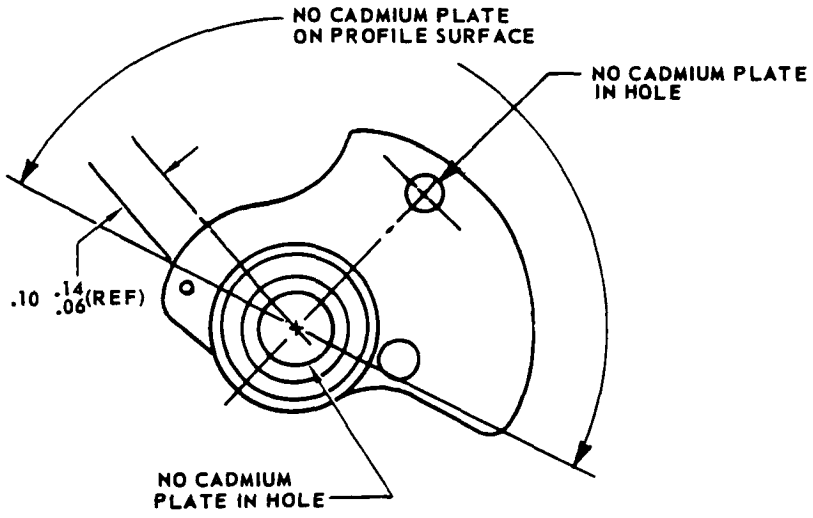
E. Computer Assembly -- Do not apply primer or enamel to exterior surfaces. Omission of primer is to facilitate penetrant examination of housings.



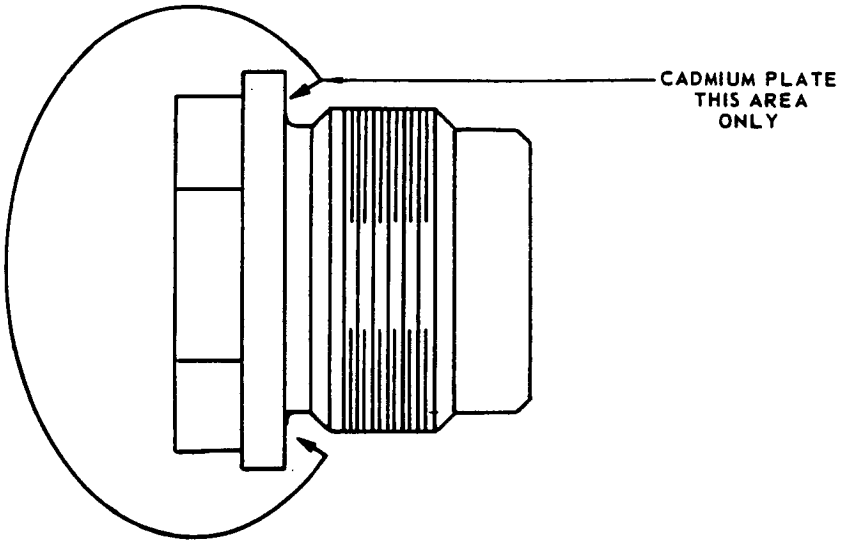
Guide Rod (28) Plating
Figure 401



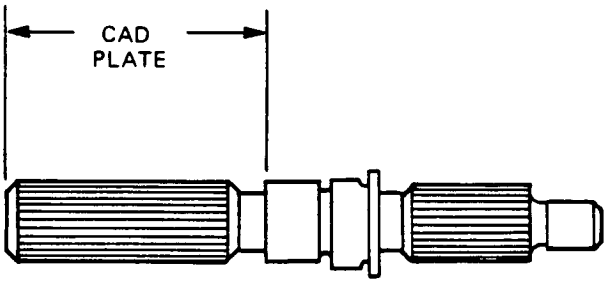
Cam Shaft Assembly (85) Plating
Figure 402



Cam Plating
Figure 403



Filter Retainer Plating
Figure 404



Q-Shaft (61, figure 1102) Plating
Figure 405

3. Replacement

A. Replace gaskets (6, 12, 68, Fig. 1101) on covers (1, 2 and 65, Fig. 1101) and cap (9, Fig. 1101).

(1) Remove old gasket.

(2) Scrape old sealant from surface and from inside of opening using a plastic scraper. Be careful not to damage surfaces.

(3) Wipe with a clean cloth wet with a cleaner per SOPM 20-30-01 to remove all traces of contamination such as grease, oil, rubber pieces, and sealant.

(4) Apply sealant, BMS 5-26 or CVA6-99, type IV 0.010 ±0.005 inch thick to mating surfaces and join immediately to prevent sealant from hardening in air. Apply sufficient pressure to obtain a "squeeze-out" of sealant around edges.

(5) Maintain light pressure and cure cemented assembly for 24 hours at temperature of 70°-80°F.

B. Replace diaphragm on bellows piston (Fig. 1101).

(1) Remove old diaphragm (27).

(2) Scrape old sealant from bellows piston (30) and bellows piston cap (26) using a plastic scraper. Be careful not to damage cap or piston surfaces.

(3) Wipe with a clean cloth wet with a cleaner per SOPM 20-30-01 to remove all traces of contamination such as grease, oil, rubber pieces, and sealant.

(4) Apply sealant, BMS 5-26 or CVA6-99, type IV 0.010 ±0.005 inch thick to mating surfaces of diaphragm (27), bellows piston (30) and bellows piston cap (26) (Fig. 406).

(5) Assemble diaphragm (27) and piston cap (26) to bellows piston (30) with six screws (24) and six washers (25). Install one washer under each screw head. Tighten screws (24) to 12-15 pound-inches.

(6) Apply a fillet seal using BMS 5-26 or CVA6-99, type IV around inside edge of piston cap (26) (Fig. 406).

(7) Cure bonded assembly for 24 hours at room temperature (70-80°F).

C. Replace rubber pad (115, Fig. 1101).

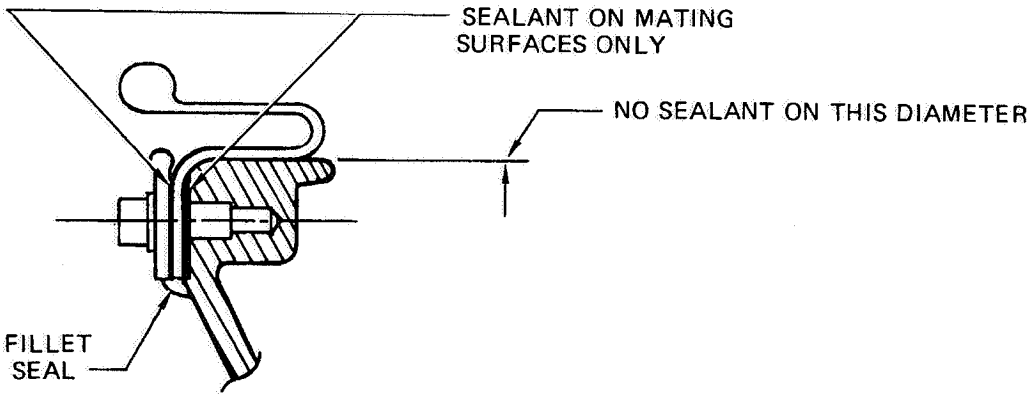
(1) Remove old pad.

(2) Scrape old adhesive from aluminum surface using a plastic scraper.

(3) Wipe with a clean cloth wet with a cleaner per SOPM 20-30-01 to remove all traces of rubber and sealant.

(4) Repeat steps A.(4)(5).

(5)(6)(7) Deleted.



Application of Sealant to Bellows Assembly (23, figure 1101)
Figure 406

D. Components replaced as matched sets or assemblies.

(1) Replace as matched set:

(a) Sleeve (108, figure 1102) and piston (109, figure 1102) are a matched assembly and must not be replaced individually.

(b) Hydraulic housing assembly (112, figure 1102) is made up of two halves which are matched and aligned through close tolerance dowel pins and must not be replaced individually.

(c) Sleeve (81, figure 1102) and slider (82, figure 1102) are a matched assembly and must not be replaced individually.

(d) Piston (40, figure 1102) and sleeve (41, figure 1102) are a matched assembly and must not be replaced individually.

(e) Cam shaft (82, figure 1101), cam (87, figure 1101) and cam (86, figure 1101) are a matched assembly and must not be replaced individually.

(2) Replace as an assembly:

(a) Piston assy (30, figure 1101)

(b) Arm assy (49, figure 1101)

(c) Fitting assy (16, figure 1101)

(d) Cam follower arm assy (57, figure 1101)

(e) Arm and clevis assy (63) and (64)

E. Replacement of helicoils.

(1) Remove old helicoil.

(2) Inspect helicoil thread. Salvage type helicoil inserts may be used as required. The maximum oversize insert which may be utilized shall not increase the pitch diameter of the standard size hole by more than 0.048 inch.

(3) Install helicoil insert with BMS 10-11, type 1, primer.

F. Replacement of bearings.

(1) Replacement of bearings secured with rivets (49 and 57, figure 1101) and (63 and 64, figure 1102).

(a) Drill out rivet securing bearing to be replaced.

(b) Replace old bearing, bushing, rivet and washers.

(c) Visually check item in which bearing is retained for any cracks, if all bearings in item are removed, fluorescent penetrant inspect. Replace if defects are found.

(d) Align new bearings, washers and bushings per assembly procedure for item.

(e) Insert and secure rivet.

NOTE: Rivets must be squeezed unless otherwise specified.

(2) Replace bearing (18, figure 1101).

(a) Extract old bearing.

(b) Check bore to be 0.3748 to 0.3753 inch diameter.

(c) Press new bearing (18) with wet primer per BMS 10-11, type 1.

(d) Ball stake bearing in accordance with Subject 20-50-03, "Bearing Installation and Retention."

(3) Replacement of staked bearings. (See figure 407.)

(a) Press out bearing or bushing.

(b) Visually check item for any cracks. If all bearings and bushings in item are removed, fluorescent penetrant inspect. Replace item if any defects are found.

(c) Press new bearing or bushing into arm to dimension shown in figure 407.

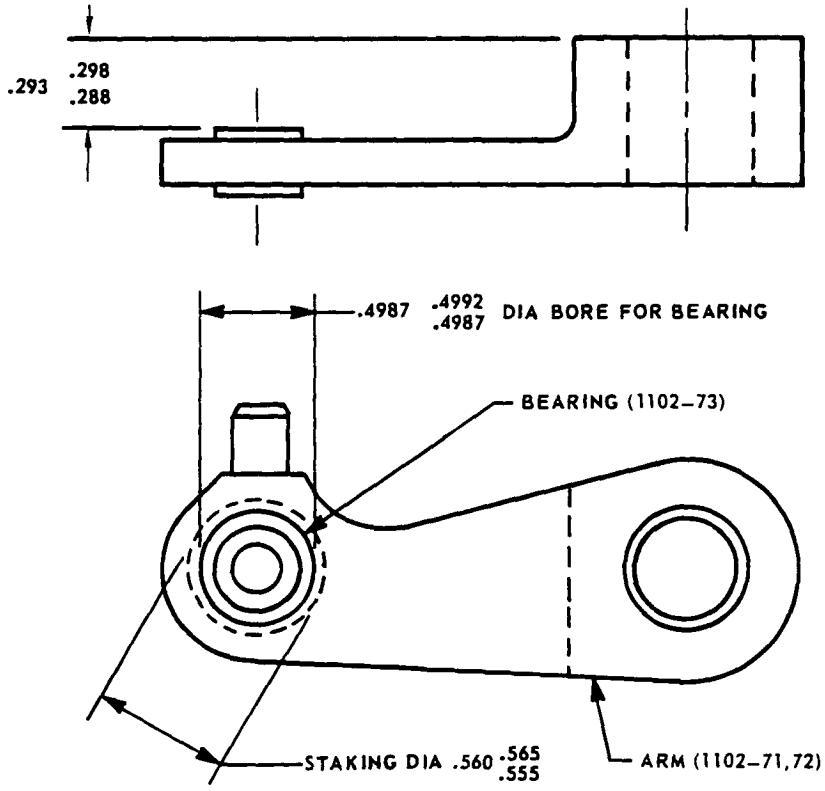
(d) Secure bearing by staking in accordance with Subject 20-50-03.

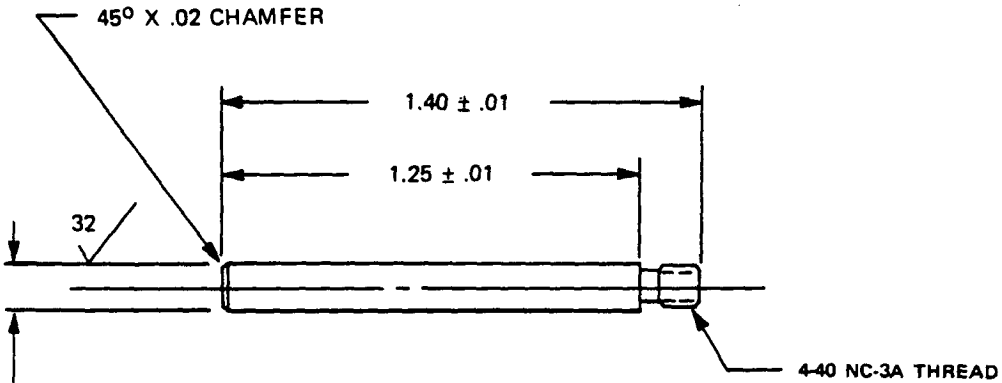
G. Replacement of sheared or damaged shear pins (78, figure 1101).

(1) Shear pins (78) shall have a snug sliding fit with mating hole and shall have a maximum diametral clearance of 0.0005 inch. Salvage shear pins may be fabricated per figure 408 as required. The mating holes in cams (86) and (87) and shaft (82) shall not exceed 0.1307 inch diameter.

H. Replacement of lee plugs (119 and 120, figure 1102).

(1) If required, remove and replace lee plugs in accordance with Subject 20-50-04, "Installation of Permanent Drill Passage Pin and Plug."





NOTES:

1. MATERIAL ALUMINUM BRONZE ROD, 0.250 ROD PER QQ-B-679 COMP 1.
2. 125 MICROINCH MACHINE FINISH.
3. BREAK ALL SHARP EDGES.
4. ALL DIMENSIONS ARE IN INCHES.

Salvage Shear Pin Configuration
Figure 408

I. Replacement of bushing (64, Fig. 1101) (Fig. 409).

(1) Press out bushing.

(2) Clean bore and check that ID is 0.3746-0.3755 inch.

(3) Visually check arm (57, Fig. 1101) for cracks. If bearing (60, Fig. 1101) has been removed, penetrant examine are (58, Fig. 1101) and replace if cracks are found.

(4) Press in new bushing (64, Fig. 1101) per 20-50-03 using primer per BMS 10-11, type 1.

(5) Machine bushings (64, Fig. 1101) to dimensions shown in Fig. 409.

4. Materials

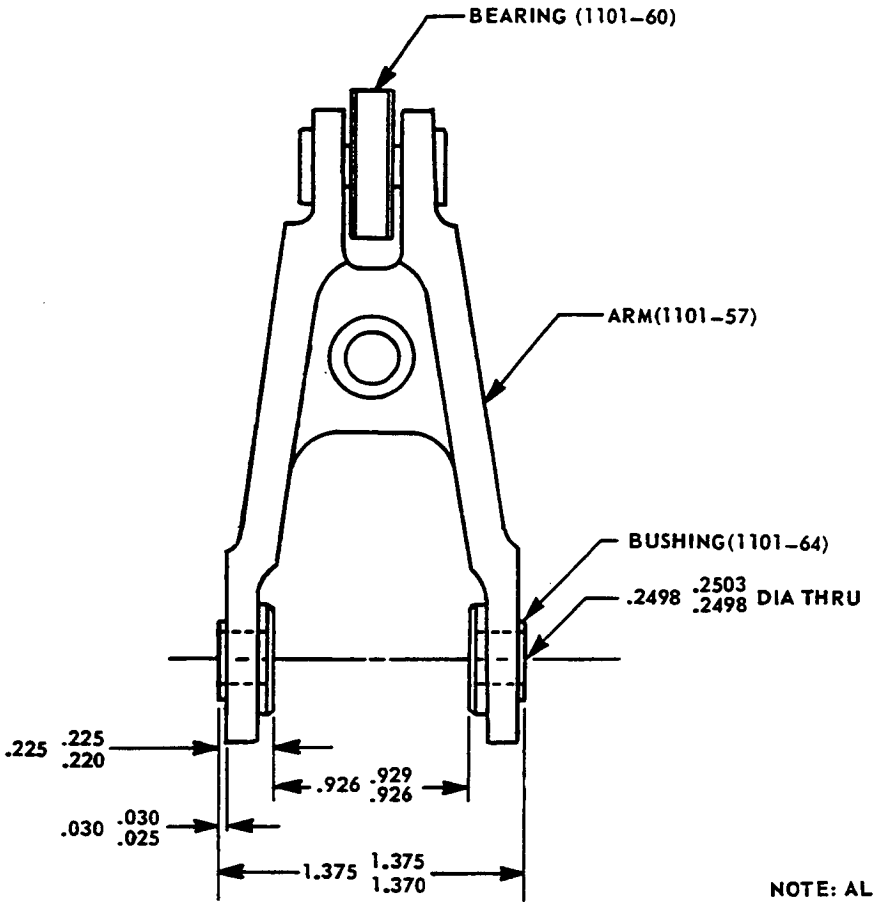
A. Deleted

B. Assembly Lubricant -- Skydrol, MC5352 (Ref 20-60-03)

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

D. Sealant -- BMS 5-26 (Ref 20-50-12) (Opt CVA6-99, Type IV, V83527)

E. Primer -- BMS 10-11, type 1 (Ref 20-60-02)



NOTE: ALL DIMENSIONS ARE IN INCHES

Replacement of Bushings
Figure 409

ASSEMBLY

1. General

   A. Lubricate all O-rings and backup rings with BMS 3-11 hydraulic fluid or Skydrol Assembly Lube MCS 352 and install per Subject 20-50-06, paragraph 8.

   B. Thoroughly lubricate all internal components in figure 1102 with BMS 3-11 hydraulic fluid prior to assembly.

   C. Some items are secured with lockwire during assembly and some after final testing. Items requiring lockwire and US identification seals are shown in figure 501. Installation of lockwire should be per Subject 20-50-02 "Installation of Safetying Devices." Seals should be installed at the end of the lockwire so that the seal must be removed to separate the components.

   D. Do not install seals when they may restrict or prevent movement of a functioning component or internal parts. Only one seal is required on multiple lockwire patterns of bolt groups attaching common parts. All external adjustment points or points of disassembly which do not have a seal should be sealed with inspection lacquer (Torque Seal Lacquer or equivalent) to prevent tampering.

2. Assemble hydraulic control assembly. (See figure 1102.)

   A. Install O-rings (110) and backup rings (111) on sleeve and piston assemblies (107).

      CAUTION: THE SLEEVE AND PISTON ASSEMBLIES (107) ARE PRECISION ASSEMBLIES. AVOID ALL UNNECESSARY HANDLING. PARTS AND/OR ASSEMBLIES MUST BE PROTECTED AT ALL TIMES WHEN NOT IN USE. CHECK FOR MATCHED SET (SLEEVE AND SLIDER SHOULD BE MARKED WITH SAME SERIAL NUMBER).

   B. Install a sleeve and piston assembly (107) in each hydraulic housing (112) until bottomed.

      CAUTION: HYDRAULIC HOUSINGS (112) SYSTEM A AND SYSTEM B SHOULD BE A MATCHED SET AND EACH HOUSING SHOULD BE MARKED WITH THE SAME SERIAL NUMBER.

Item	Figure and Item No.	Safety Wire	Seal
Screw	1101-3	MS20995-C32	US1
Screw	1101-10	MS20995-C32	US1
Nut	1101-14	MS20995-C32	US1
Fitting Assy	1101-16	MS20995-C32	
Screw	1101-24	MS20995-C20	
Guide Rod	1101-28	MS20995-C20	
Screw	1101-44	MS20995-C20	
Screw	1101-46	MS20995-C20	
Nut	1101-47	MS20995-C20	
Screw	1101-66	MS20995-C20	US1
Nut	1101-69	MS20995-C20	
Screw	1101-71	MS20895-C20	
Retainer	1101-79	MS20995-C20	US1
Retainer	1101-80	MS20995-C32	US1
Screw	1101-104	MS20995-C32	US1
Screw	1101-106	MS20995-C32	US1
Filter Retainer	1102-1	MS20995-NC32	US1
Screw	1102-7	MS20995-NC20	US1
Screw	1102-21	MS20995-NC20	US1
Screw	1102-24	MS20995-NC20	
Screw	1102-29	MS20995-NC20	US1
Screw	1102-33	MS20995-NC20	
Retainer	1102-37	MS20995-NC20	
Preload Retainer	1102-46	MS20995-NC32	US1
Screw	1102-53	MS20995-NC20	
Valve Retainer	1102-76	MS20995-NC32	US1

Safety Wire and Seal Installation Data
Figure 501

C. Assemble hydraulic housings (112) system A and system B together with the following attachment bolts:

(1) Bolt (91), nut (92) and washers (93). Install one washer under nut and one under bolt head. (Direction of bolt optional.) Tighten to a torque range of 20 to 25 pound-inches.

(2) Bolts (104), nuts (105) and washers (106). Install one washer under each nut and one under each bolt head. (Direction of bolt optional.) Tighten to a torque range of 20 to 25 pound-inches.

(3) Bolts (94), nuts (95), washers (97 and 96). Install one washer (96) under each nut and one washer (97) under each bolt head. (Direction of bolt optional.) Tighten to a torque range of 20 to 25 pound-inches.

(4) Bolt (100), nut (101), washer (102 and 103). Install washer (102) under nut and washer (103) under bolt head. (Direction of bolt optional.) Tighten to a torque range of 20 to 25 pound-inches.

(5) Bolt (98) and washer (99). Install washer under head. Tighten to a torque range of 20 to 25 pound-inches.

NOTE: The following procedure is applicable to both A and B systems.

D. Lubricate bearing (75) lightly with BMS 3-11 hydraulic fluid and install in housing.

E. Place arm-clevis assemblies (63 and 64) in respective housings (112). Install "Q" shaft (61) through, spring (62), appropriate arm-clevis assembly, washer (74) and into bearing (75).

CAUTION: BEARING (60) SHALL BE EXAMINED TO ENSURE A STEEL BALL SEPARATOR CAGE IS UTILIZED.

F. Install square O-ring (57) and cap ring (58), seal retainer (59) and bearing (60) in inside diameter of "Q" shaft retainer (52) and O-ring (55) with backup rings (56) on outside diameter of "Q" shaft retainer (52).

G. Install assembled retainer (52) over "Q" shaft (61) using O-ring installation tool to protect cap ring (58) in inside diameter of "Q" shaft retainer (52).

H. Install screws (53) with washer (54) under each head. Lockwire using double twist method.

I. Install valve assembly (80) as follows:

(1) Install O-rings (84) and backup rings (85) on valve sleeve (81).

CAUTION: VALVE ASSEMBLY (80) IS A PRECISION PART. AVOID ALL UNNECESSARY HANDLING. PART MUST BE PROTECTED AT ALL TIMES WHEN NOT IN USE. SLEEVE (81), SLIDER (82) ARE MATCHED SETS AND SHOULD BE MARKED WITH THE SAME SERIAL NUMBER FORMING VALVE ASSEMBLY (80).

(2) Install valve assembly (80) in hydraulic housing (112).

(3) Place O-ring (77) and backup rings (78) on valve retainer (76).

(4) Install compression spring (79) on valve slider (82).

(5) Coat threads of valve retainer (76) with thin coat of MCS 352 lube. Install retainer (76) and tighten to a torque range of 250 to 300 pound-inches. Lockwire using double-twist method and apply US1 identification seal to lockwire.

J. Install plunger (86) on poppet (83). Place shims (87, 88, 89 and 90) on plunger (86).

NOTE: This is an initial shim adjustment; final adjustment may be necessary during testing (Ref TESTING, par. 7.B.(6)).

K. Install spring guide (48) on arm-clevis assemblies (63 and 64).

L. Install O-ring (47) on preload retainer (46). Coat threads of preload retainer (46) with a thin coat of MCS 352 lubricant. Install three shims (51).

NOTE: Four shims (51) may be required to facilitate rigging with shim (50).

Install shim (50) (Ref TESTING, par. 8) and spring (49) in preload retainer (46).

M. Install preload retainer (46) with shims (51) and (50) and spring (49). Tighten to 150-175 pound-inches.

N. Install sleeve and piston assembly (38) as follows:

(1) Install O-ring (42) and cap strip (43) on piston (40). Lubricate the assembly lightly with BMS 3-11 hydraulic fluid or MCS 352 lube.

(2) Stroke the piston assembly in the sleeve a minimum of 100 cycles.

CAUTION: SLEEVE AND PISTON ASSEMBLY (38) IS A PRECISION ASSEMBLY. AVOID ALL UNNECESSARY HANDLING. PARTS AND/OR ASSEMBLIES MUST BE PROTECTED AT ALL TIMES WHEN NOT IN USE BY PLACING IN ADEQUATE CONTAINER. CHECK FOR MATCHED SET (SLEEVE AND PISTON SHOULD BE MARKED WITH SAME SERIAL NUMBER).

(3) Install O-ring (44) and backup rings (45) on sleeve (41). Lubricate the assembly lightly with BMS 3-11 hydraulic fluid or MCS 352 lube.

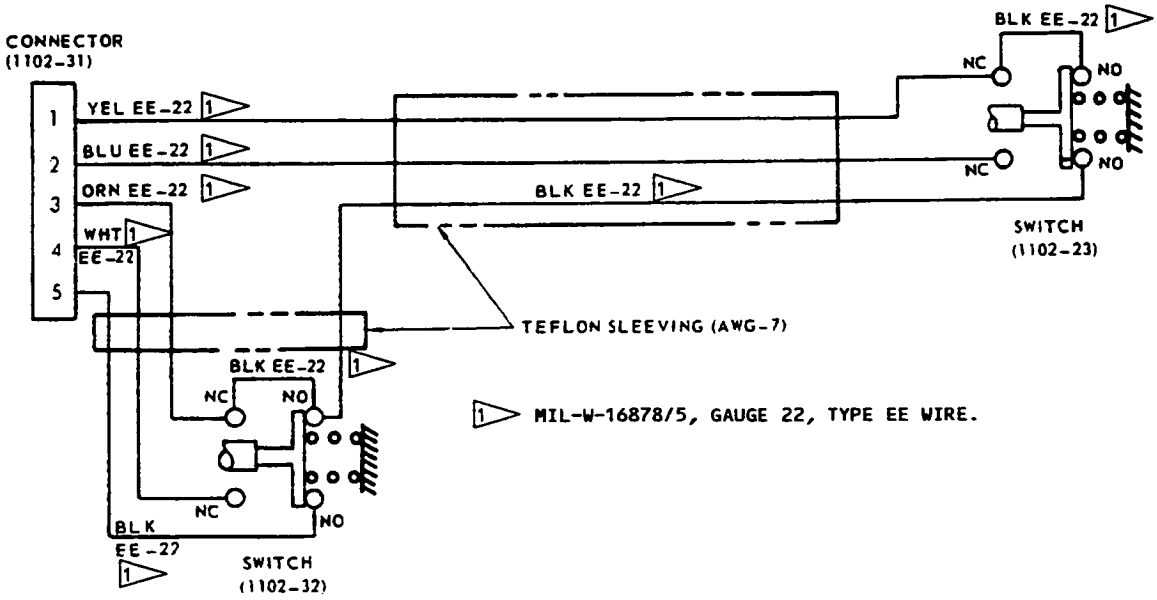
(4) Install a sleeve and piston assembly (38) in each hydraulic housing (112) until bottomed.

(5) Coat threads of retainer sleeve (37) with a thin coat of MCS 352 lubricant. Install retainer sleeve and tighten to 250-300 pound-inches. Lockwire using double-twist method.

O. Install wiring as follows (Fig. 502):

(1) Install wires and sleeving through wire passage in housing. Sleeving to extend to 0.50 inch maximum from terminals (Fig. 503).

(2) Attach switch (23), providing approximately one inch of slack in wires, to retainer sleeve (37) with two screws (24), nut plate (26) and two washers (25). Install one washer under each head and tighten to 2-3 pound-inches.



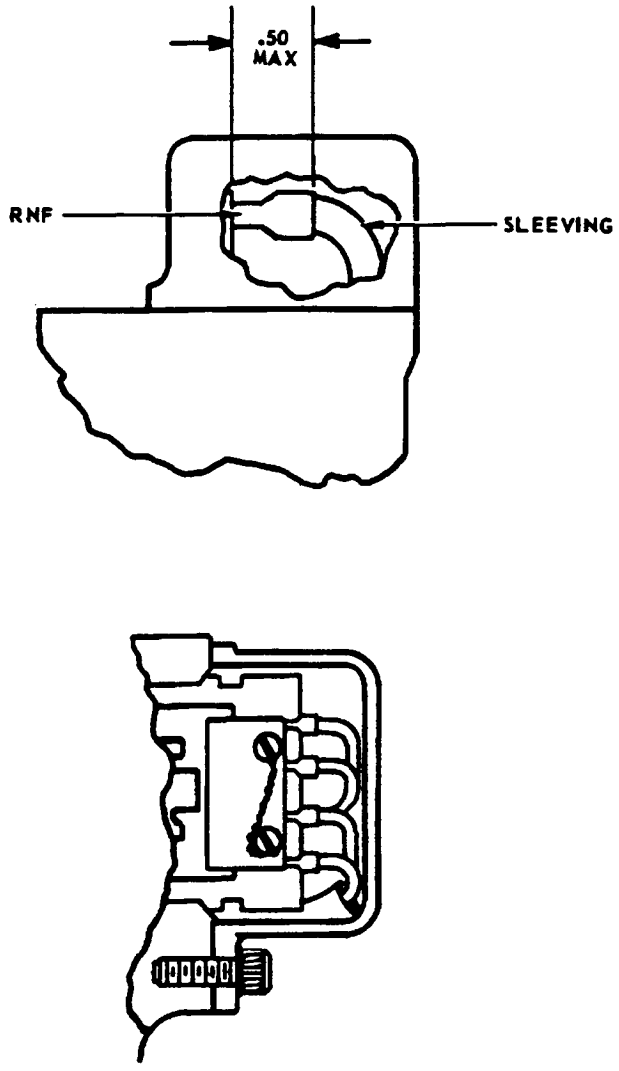
Wiring Diagram
Figure 502

(3) Attach switch (32), providing approximately one inch of slack in wires, to retainer-sleeve (37) with two screws (33), nut plate (35) and two washers (34). Install one washer under each head and tighten to 2-3 pound-inches.

NOTE: Do not lockwire at this time.

(4) Solder wire per SOPM 20-12-01 to switch terminals and cover terminals with a shrink fit tubing (36). (See Fig. 503.)

NOTE: The switch covers (28) and (20) should not be installed until switches are rigged. (See TESTING, par. 8.)



Switch Terminals
Figure 503

(5) Allow for approximately 1 inch of slack in wires when connector (31) is attached to cover (28) but do not attach to cover at this time. Crimp the wire to the connector pins.

P. Install O-ring (4) and two backup rings (5) on filter. Install filter (3) in each hydraulic housing (112).

Q. Install O-ring (2) on filter cap. Coat threads and bearing shoulder of filter cap (1) with thin coat of MCS 352 lubricant. Install filter retainer (1) in hydraulic housing (112) and tighten to 550-650 lb-in.

R. Install two O-rings (9) and four backup rings (10) on both plug seals (6). Install plug seals (6) in hydraulic housing (112) with four screws (7) and four washers (8). Install one washer under each head. Tighten to 20-25 pound-inches. Lockwire using double-twist method.

S. Install O-ring (13) on union (12). Install union in hydraulic housing (112).

T. Install two O-rings (16) on two reducers (15). Install one reducer in each hydraulic housing (112).

U. Install three O-rings (19) on three reducers (18). Install the three reducers (18) in hydraulic housing (112), one in system A housing and two in system B housing.

V. Perform rig and acceptance test of hydraulic control assembly (Ref TESTING).

W. Install shipping and storage caps (11), (14) and (17).

X. Complete assembly of hydraulic housing.

(1) Check that torque on screws (24, 33) in retaining switches (23, 32) is 2-3 lb-in. Lockwire using double-twist method.

(2) Install connector (31) in cover (28) with connector nut. Tighten to 30-80 lb-in. Fill back end of connector with sealant, 30-121 to cover insert, pins, and end face of connector. Install dust cap (27).

(3) Install cover (28) on hydraulic housing (112) with four screws (29) and four washers (30). Install one washer under each head. Tighten to 9-12 pound-inches. Lockwire using double-twist method. Pattern must be as shown in Fig. 504. Apply one USI identification seal to each wire pattern.

(4) Install cover (20) on hydraulic housing (112) with three screws (21) and three washers (22). Install one washer under each head. Tighten to 9-12 pound-inches. Lockwire using double twist method. Pattern must be as shown in Fig. 505. Apply US1 identification seal to lockwire.

3. Assemble computer assembly (Fig. 1101 and 1102)

A. Install 0-rings (120 and 121, Fig. 1101) in each hydraulic housing (112, Fig. 1102) of system A and B.

B. Assemble two O-rings (117, Fig. 1101) on the cam shaft sleeve (116).

C. Install sleeve (116) in housing assembly (106).

D. Assemble housing assembly (106, Fig. 1101) to hydraulic housing assembly (122) with the following attachment screws.

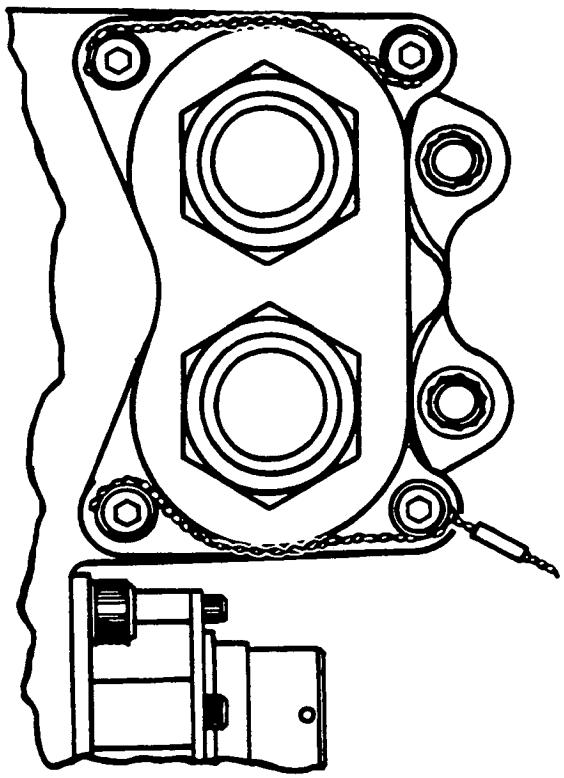
(1) Three screws (104) and three washers (105). Place one washer on each screw and install screws through holes provided in the hydraulic housing assembly (122) and into threaded inserts in the housing assembly (106). Tighten to 40-50 pound-inches. Lockwire using double twist method. Apply US1 identification seal to lockwire.

(2) Two screws (104) and two washers (105). Place one washer on each screw and install screws through holes provided in the housing assembly (106) and into threaded inserts in the hydraulic housing assembly (122). Tighten to 40-50 pound-inches. Lockwire using double twist method. Apply US1 identification seal to lockwire.

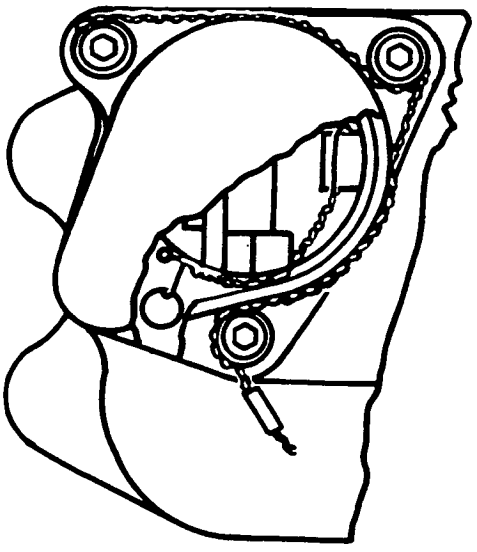
(3) One screw (102) and one sealing washer (103). Place washer on screw and install screw through hole provided in the housing assembly (106) and into threaded insert in the hydraulic assembly (122). Tighten to 40-50 pound-inches. Lockwire to open holes in existing lockwire pattern on Q shaft retainer (52, Fig. 1102).

E. Assemble housing assembly (107) to hydraulic housing assembly (122), (repeat par. 3.B. above). After assembly, check for 6.980 to 7.000 inch dimension between outer facing of lower mounting lugs on housing assemblies (106, 107).

F. Lubricate the two Q springs (37) lightly with MCS 352 lube. Assemble the two Q springs (37) on Q spring shaft (61, Fig. 1102) and retain Q springs with screws (38, Fig. 1101) and washers (39). Install one washer under each screw head and tighten to 20-25 pound-inches.



Cover Lockwire Pattern
Figure 504



Switch Cover Lockwire Pattern
Figure 505

G. Assemble O-ring (19) on both fitting assemblies (16).

H. Lubricate threads of both fitting assemblies (16) lightly with MCS 352 lube. Assemble fitting assemblies in both bellows cap (9). Install washer (15) and nut (14) on both assemblies.

NOTE: Do not lockwire at this time. Washer, nut and fitting should not be primed.

I. Assemble two bellows assemblies (23) as follows:

(1) Install guide rod (28) into piston (30) with washer (29) and tighten to 30-40 pound-inches. Lockwire using double twist method.

CAUTION: DIAPHRAGM TO BE SUITABLY PROTECTED AT ALL TIMES.

(2) Diaphragm (27) shall be assembled to bellows piston (30) per replacement instructions. (See REPAIR, paragraph 3.B.)

J. Install bellows assemblies (23) as follows:

(1) Position guide rod (28) into fitting assembly (16).

(2) Place gasket (12) and bellows guide (13) on bellows cap (9).

(3) Place diaphragm (27) around bellows guide (13) and install assembly in housing assemblies (102 and 103) trapping diaphragm between housing assembly and bellows guide.

(4) Lubricate bolt (20) lightly with MCS 352 lube.

(5) Attach rod end of bellows assembly (23) to "Q" spring (37) with bolt (20), nut (22) and four washers (21). Install one washer under bolthead, one on both sides of "Q" spring (37) and one under the nut. Tighten nut to 12-20 pound-inches.

(6) Secure bellows cap (9) with six screws (10) and six washers (11). Install one washer under each head. Tighten to 20-25 pound-inches. Lockwire using double twist method. Apply USl identification seal to lockwire.

K. Install cam and shaft assembly (81) as follows:

(1) Install O-ring (94) and cap ring (95) in housing assembly (106).

(2) Install O-ring (90), cap ring (91) and shaft and plug assembly (82) in housing assembly (107).

CAUTION: CAM AND SHAFT ASSEMBLY (81) IS A MATCHED SET. SHAFT AND PLUG ASSEMBLY (82), CAM (87) AND CAM (86) SHOULD BE MARKED WITH THE SAME SERIAL NUMBER.

(a) Install O-ring (90), cap ring (91) in housing assembly (107) then install shaft and plug assembly (82).

1) Install O-ring (90) and cap ring (91) together as an assembly in housing assembly (107) with assembly lube MCS 352. Press seal assembly straight in without bending into an elliptical shape to avoid damaging the seal assembly.

2) Lubricate bore of cams (86, 87) with MCS 352 lube. Position cam (86) in housing assembly (106) and cam (87) in housing assembly (107). Install shaft and plug assembly (82) through housing assembly (107), cam (87), sleeve (116), cam (86) and housing assembly (106).

(b) (Optional method) Install O-ring (90) and cap ring (91) on shaft and plug assembly (82), then install parts in housing assembly (107).

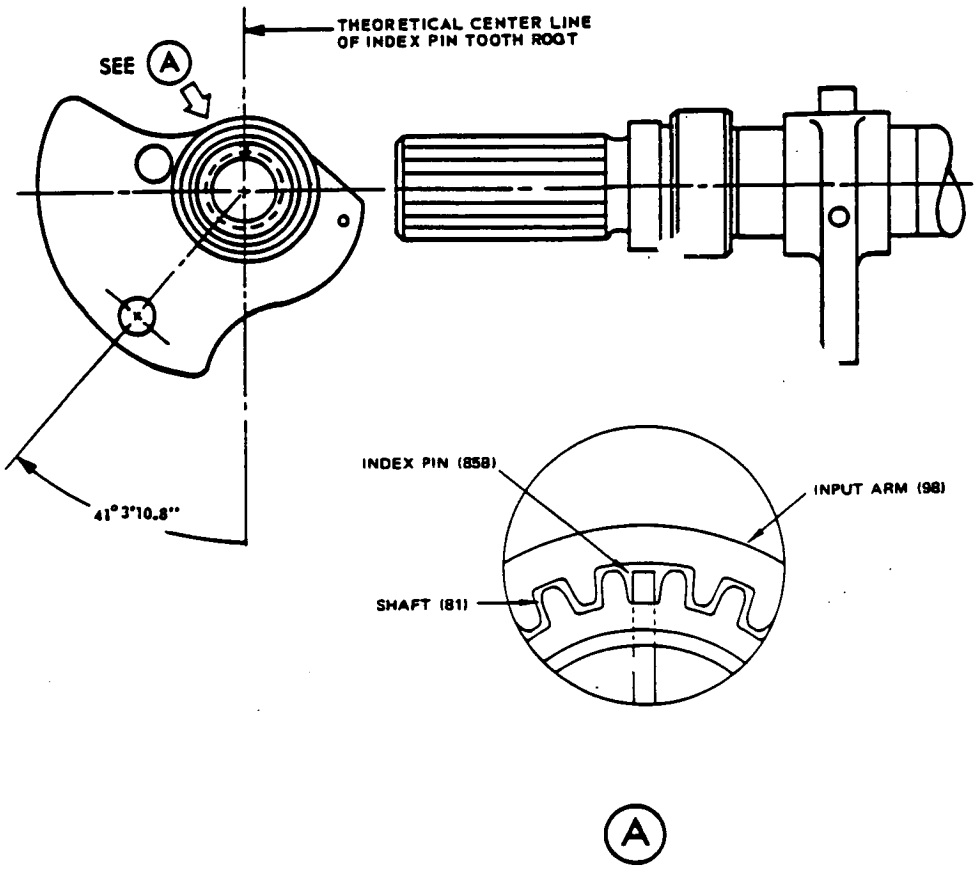
1) Assemble O-ring (90) and cap ring (91) and install on shaft and plug assembly (82). Install plunger assembly F80252-3 on splined end of shaft and plug assembly to retain O-ring and cap ring.

2) Lubricate guide F80252-2 with assembly lube MCS 352 and install guide in housing assembly (107).

3) Lubricate bore of cams (86, 87) with MCS 352 lube. Position cam (86) in housing assembly (106) and cam (87) in housing assembly (107). Install shaft and plug assembly (82) thru guide F80252-2 in housing assembly (107), cam (87), sleeve (116), cam (86) and housing assembly (106).

4) Position O-ring (90) and cap ring (91) using plunger assembly if required, then remove plunger and guide.

(3) Align cam (87) and (86) on shaft and plug assembly (82) 41° 3' 10.8" from centerline of index pin as shown in Fig. 506. Lubricate shear pins (78) lightly with MCS 352 lube and insert one pin in each cam. Secure shear pins (78) in place with cotter pins (77).



Cam Alignment
Figure 506

(4) Install seal retainer (89) and bearing (88) in housing assembly (103). Lubricate the threads of retainer (80) lightly with MCS 352 lube. Install retainer (80) in housing assembly (107) and tighten to 100-150 pound-inches. Lockwire using double twist method. Apply US1 identification seal to lockwire.

(5) Install shipping sleeve (98) or input arm (98).

CAUTION: USE CARE WHEN HANDLING UNIT WITH INPUT ARM INSTALLED. ROTATION OF ARM AGAINST CAM STOPS MAY DAMAGE CAMSHAFT SHEAR PINS.

(a) Lightly lubricate threads of plug (96) with MCS 352 lube.

CAUTION: INDEX PIN MUST BE ALIGNED CORRECTLY WITH INPUT ARM SPLINES OR CONNECTION TO CAMSHAFT WILL BE DAMAGED AND RESULT IN MALFUNCTION. DO NOT PERMIT INPUT ARM TO ROTATE AGAINST INTERNAL STOPS WHEN PLUG (96) IS TIGHTENED.

(b) Install input arm (98) on shaft (81) with index pin on shaft aligned with omitted tooth on input arm. Install washer (97) and plug (96). Restrain input arm to prevent contact with internal stops and tighten to 150-200 lb-in.

NOTE: Although 65-45132-5, -7, -8 configurations include shipping sleeve (98) instead of input arm (98), installation of arm is recommended to provide improved method of restraint by use of safety pin (124).

(6) Install seal retainer (93) and bearing (92) in housing assembly (106). Lubricate the threads of retainer (79) lightly with MCS 352 lube. Install retainer (79) in housing assembly (106) and tighten to 100-150 lb-in. Lockwire using double twist method. Apply US1 identification seal to lockwire.

NOTE: Primer should be omitted from retainers (79 and 80).

L. Lubricate two screws (71) lightly with MCS 352 lube. Install screws in housing assemblies (106, 107). Retain with nut (69) and washer (70). Do not tighten or lockwire nut at this time.

M. Install two bearings (56) in housing assembly (106). Install two bearings (56) in housing assembly (107).

N. Assemble stab spring arm assembly (49) as follows:

(1) Lubricate screws (44) and (46) lightly with MCS 352 lube.

(2) Assemble preload spring bracket (42) on one arm assembly (49) and secure with screws (44 and 46). Install one screw (44) with one washer (45) and tighten to 9-12 lb-in. Install one screw (46) with one washer (48) and one nut (47). Do not tighten nut at this time.

(3) Assemble preload spring bracket (43) on one arm assembly (49) and secure with screws (44 and 46). Install one screw (44) with one washer (45) and tighten to 9-12 pound-inches. Install one screw (46) with one washer (48) and one nut (47). Do not tighten nut at this time.

(4) Do not lockwire screws (44) or nuts (47) at this time.

O. Install arm assemblies (49) in housing assemblies as follows:

(1) Place arm assembly (49), with preload bracket (42) installed, in housing assembly (106), and arm assembly (49), with preload bracket (43) installed, in housing assembly (103).

(2) Position arm assemblies (49) with bearing end extending through the slot in bellows assemblies (23).

(3) Install cam follower arm assemblies (57) straddling arm assemblies (49).

(4) Lubricate pivot shaft (41) lightly with MCS 352 lube.

(5) Install pivot shaft (41) through bearing (56), through one leg of cam follower arm assembly (57), through arm assembly (49), through other leg of cam follower arm assembly (57) and through second bearing (56).

(6) Attach preload springs (40) to preload brackets (42 and 43). Install other end of preload springs (40) in holes provided in housing assemblies (106, 107).

P. On 65-45132-5, -7, -8, -9 assemblies, install potentiometer drive arm (74) on cam shaft (82). Secure with screws (75) and washer (76). Tighten to 40-50 pound-inches.

Q. Install potentiometer clamp (99) on housing assembly (106). Secure with two screws (100) and two washers (101). Install one washer under each head. Tighten to 40-50 pound-inches.

R. Install one O-ring (73) on each static fitting (72). Lubricate lightly with BMS 3-11 hydraulic fluid or MCS 352 lube. Install static fittings (72) in housing assemblies (106, 107).

S. Install one O-ring (8) on each union (7). Lubricate lightly with BMS 3-11 or MCS 352 lube. Install unions (7) in both pitot ports in bellows caps (9).

T. Rig and acceptance test computer assembly (Ref TESTING).

U. Complete assembly of computer assembly.

(1) Tighten nut (14) to 50-80 pound-inches. Lockwire using double-twist method. Apply US1 identification seal to lockwire.

(2) Tighten two nuts (47) to 12-20 pound-inches. Lockwire using double-twist method to screw (44).

(3) Tighten two nuts (69) to 12-20 pound-inches. Lockwire using double-twist method to housing assemblies (106, 107).

(4) Install covers (65) on housing assemblies (106, 107) with two screws (66) and two washers (67). Install one washer under each head. Tighten to 9-12 pound-inches. Lockwire using double-twist method. Apply US1 identification seal to lockwire.

(5) Bond gaskets (6) to covers (1 and 2) per replacement instructions(Ref REPAIR par. 3.A.).

(6) Install cover (1), with bonded gasket (6), on housing assembly (106) and cover (2), with bonded gasket (6), on housing assembly (107) with 16 screws (3), 16 washers (4), and two O-rings (5). Place one washer (4) and one O-ring (5) on two screws (3) and install screws in specific holes shown in Fig. 1101. Place one each washer (4) on remaining screws (2) and install screws. Tighten to 12-15 pound-inches. Lockwire using double-twist method. Apply US1 identification seal to lockwire.

(7) Attach nameplate (118) to sleeve (116) by placing straps (119) through nameplate and bending back to give firm fit.

4. Materials

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

B. Assembly Lubricant -- MCS 352 (Skydrol)(Ref 20-60-03)

C. Silicone Sealant -- 30-121 (Ref 20-60-04)

		Design Dimensions				Service Wear Limits		
Ref Letter Fig.601	Mating Item No. Fig.1101	Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inches)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
	ID 18 OD 28	0.2515 0.245	0.2525 0.246	0.0055	0.0075	0.243	0.258	0.0150
	ID 34 OD 20	0.1873 0.1871	0.1875 0.1873	0.0000	0.0004	0.1868	0.1878	0.0010
	ID 37 OD 20	0.1873 0.1871	0.1878 0.1873	0.0000	0.0007	0.1867	0.1882	0.0015
	ID 64 OD 41	0.2498 0.2494	0.2503 0.2498	0.0000	0.0009	0.2488	0.2506	0.0018
	ID 86,87 *[1] OD 85			0.00000	0.00050			
	ID 85,86 *[2] 87 OD 78	0.12525 0.1250	0.12550 0.1252	0.00005	0.00050			
	ID 56 OD 41	0.2490 0.2494	0.2500 0.2498	0.0000	0.0006	0.2488	0.2503	0.0015
	ID 98E OD 98B	0.3762 0.3754	0.3767 0.3761	0.0001	0.0013	0.3745	0.3785	0.0040
	ID 88 OD 85	0.8745 0.8740	0.8750 0.8745	0.0000	0.0010	0.8735	0.8755	0.0020
	ID 92 OD 85	0.7495 0.7492	0.7500 0.7495	0.0000	0.0008	0.7485	0.7505	0.0020

Ref Letter Fig.601	Mating Item No. Fig.1101	Design Dimensions				Service Wear Limits		
		Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inches)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
	ID 98B OD *[3]	0.2495 0.2485	0.2505 0.2495	0.0000	0.0020	0.2465	0.2525	0.0060
	ID 81 OD 82	0.3135	0.3145	*[4]	0.0010			*[5]
	ID 81 OD 82	0.4805	0.4815	*[4]	0.0010			*[5]
	ID 81 OD 83	0.1870 0.1850	0.1879 0.1855	0.0015	0.0029	0.1835	0.1895	0.0060
	ID 60 OD 61	0.4722 0.4720	0.4724 0.4722	0.0000	0.0004	0.4717	0.4727	0.0010
	ID 75 OD 61	0.2498 0.2496	0.2500 0.2498	0.0000	0.0004	0.2493	0.2503	0.0010
	ID 41 OD 40	0.3290	0.3300	*[4]	0.0010			*[5]
	ID 108 OD 109	0.6877	0.6887	*[4]	0.0010			*[5]
	ID 108 OD 109	0.3290	0.3300	*[4]	0.0010			*[5]

*[1] Lap fit material removed from ID of cams (86 and 87) to obtain this clearance.

*[2] Parts may also incorporate oversize shear pins. (Refer to Repair, paragraph 3.G.)

*[3] Installation part.

*[4] Parts lapped from no clearance.

*[5] No dimensional service wear limit. Serviceability determined by results of leakage limits in functional test.

Fits and Clearances
Figure 601 (Sheet 3)

1. Torque values

A. Torque values are listed in figure 602.

Nomenclature	Figure and Item No.	Torque Value (pound-inches)
Plug	1101-96	25 to 50
Retainer	1101-80	100 to 150
Retainer	1101-79	100 to 150
Nut	1101-69	12 to 20
Nut	1101-47	12 to 20
Guide rod	1101-28	30 to 40
Nut	1101-14	50 to 80
Nut	1102-101	20 to 25
Nut	1102-95	20 to 25
Valve retainer	1102-76	250 to 300
Preload retainer	1102-46	150 to 175
Retainer	1102-37	250 to 300
Connector nut	1102-31	30 to 80
Filter retainer	1102-1	550 to 650

TESTING

1. Test Equipment

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

A. Hydraulic test stand

B. Filter with filtering capability of 10 microns nominal, 25 microns absolute

C. Electrical power supply capable of:

(1) 28 volts dc

(2) 115 volts ac, 60 Hz

D. Air supply, 0-15 psi regulated

E. Pressure gages

(1) 0-500 psi range, ± 2 psi tolerance

(2) 0-3000 psi range, ± 5 psi tolerance

(3) 0-4500 psi range, ± 25 psi tolerance

F. High voltage tester

G. Graduates: 10 cc, 100 cc, 250 cc and 500 cc

H. Pressure transducer, hydraulic

I. Pressure transducer, pneumatic

J. Mercury manometer

K. X-Y plotter recorder

L. Deleted

M. Spring scales, compression

(1) 0-16 ounces, ± 2% of full scale

(2) 0-50 grams in increments of 5 grams maximum

(3) 0-1000 grams in increments of 50 grams

2. Material

A. Perform all tests with BMS 3-11 hydraulic fluid. Observe all standard precautions for the use and handling of this fluid

NOTE: Skydrol 7000 hydraulic fluid may be used during those tests which are conducted at room temperature.

3. Test Conditions

A. Conduct all testing at an ambient room temperature of 60-100°F. The atmospheric pressure shall be 12-15 psi. The relative humidity shall be from 10-90 percent.

B. Unless otherwise specified the fluid temperature shall be 80-120°F. The fluid shall be filtered as required to maintain the following maximum particle count. Maximum contaminant levels when made per SAE ARP No. 598 "Procedure for the Determination of Particle Contamination of Hydraulic Fluid by the Particle Count Method" are as follows:

Micron Size	Maximum Particle Count
5-15	32,000
16-25	10,700
26-50	1,510
51-100	225
101 and up, plus fibers	21

C. Refer to TROUBLE SHOOTING for information if components, subassemblies, or final assembly fail to function as required during testing.

NOTE: All assemblies shall be thoroughly washed and ultrasonically cleaned prior to testing.

4. Sleeve and Piston Assembly Tests (107, Fig. 1102)

A. Leakage Test

(1) Assemble sleeve and piston assembly (107) to test block (TB69-39147-1C78608) as shown in Fig. 701.

(2) Bleed the assembly at low pressure until all air is removed.

(3) Apply 2050-2150 psi to port A with port C capped.

(4) Leakage from port B shall be 6 cc/minute maximum, 1 cc/minute minimum.

(5) Leakage from port D shall be 6 cc/minute maximum, 1 cc/minute minimum.

B. Friction Test

(1) Uncap all ports.

(2) Remove sleeve and piston assembly from test block.

(3) Piston shall slide smoothly and freely through the sleeve.

(4) Place sleeve and piston assembly in horizontal position.

(5) Measure breakout force for both directions of piston movement using compression spring scale.

(6) Piston shall commence movement in sleeve with maximum of 10 grams (0.35 oz) force applied.

5. Sleeve and Piston Assembly Tests (38, Fig. 1102)

A. Leakage Test

(1) Assemble lapped assembly (39, Fig. 1102) without capstrips and O-ring in test block (TB69-39149-1C78609) as shown in Fig. 702.

(2) Bleed the assembly at low pressure until all air is removed.

(3) Apply 2050-2150 psi to port A with ports B and C capped.

(4) Leakage from protruding end of piston (port D) shall be 12 cc/minute maximum, 1 cc/minute minimum.

B. Friction Test

(1) Uncap all ports.

(2) Remove lapped assembly from test block.

(3) Piston shall slide smoothly and freely through sleeve.

(4) Place lapped assembly in horizontal position.

(5) Measure breakout force for both directions of position movement using compression spring scale.

(6) Slide shall commence movement in sleeve with maximum of 10 grams (0.35 oz) force applied.

(7) Assemble sleeve and piston assembly (38, figure 1102).

(8) Dip sleeve and piston assembly in BMS 3-11 hydraulic fluid to coat all surfaces with fluid.

(9) The piston shall slide smoothly and freely through the sleeve.

(10) Place sleeve and piston assembly in horizontal position.

(11) Measure breakout force for both directions of piston movement.

(12) Piston shall commence movement in sleeve with maximum of 400 grams (14.0 oz) force applied.

6. Valve Assembly Tests (80, figure 1102)

The following tests are to be performed with the valve assembly (80, figure 1102) assembled in the test manifold (401-09169-1C78599) as shown in figure 703. All slider stroking tests must be performed at a slow rate to minimize valve damping characteristics.

A. Manual Friction Test (No Hydraulic Pressure)

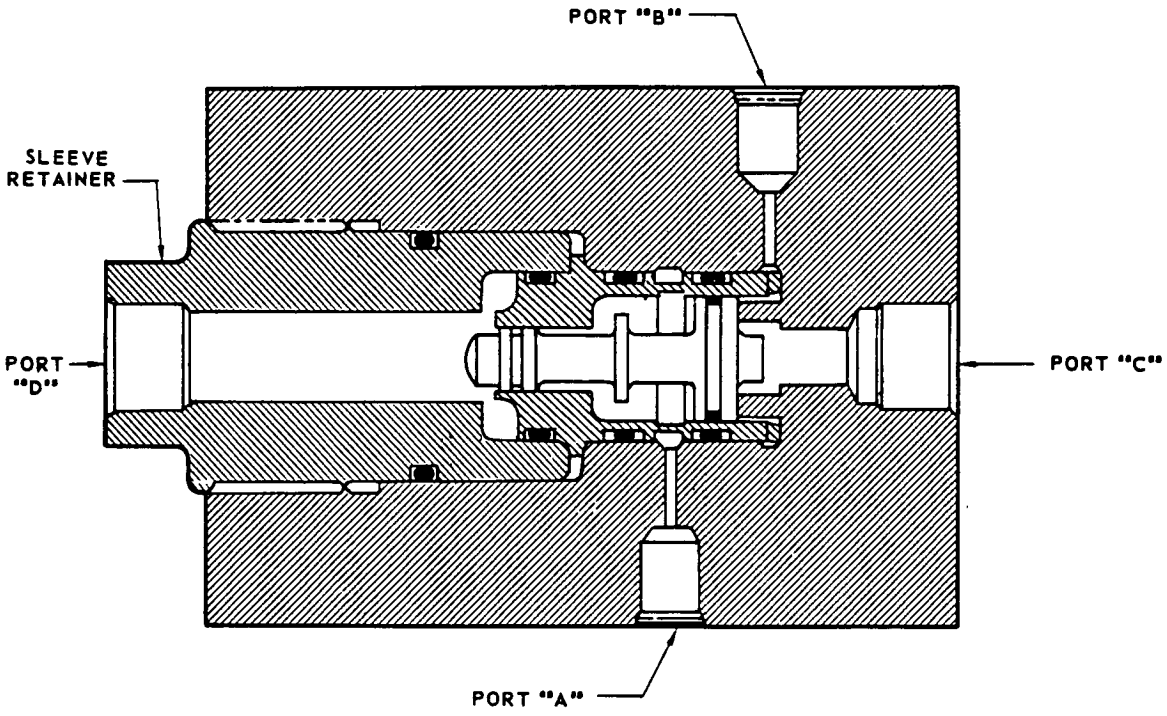
(1) Set up equipment as shown in diagram A of figure 704.

NOTE: Stroke shall be at least ± 0.05 inch from null in this test.

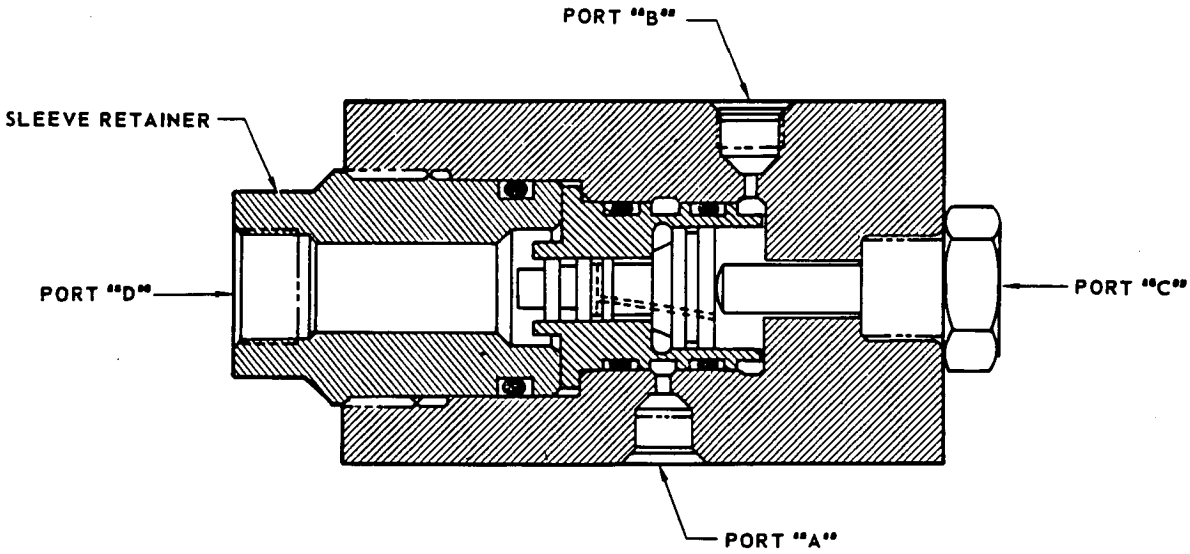
(2) Manually stroke the valve assembly through its normal operation travel range using a 0 to 16 ounce spring scale.

(3) Note breakout force required to start valve movement in either direction at several points along the valve travel.

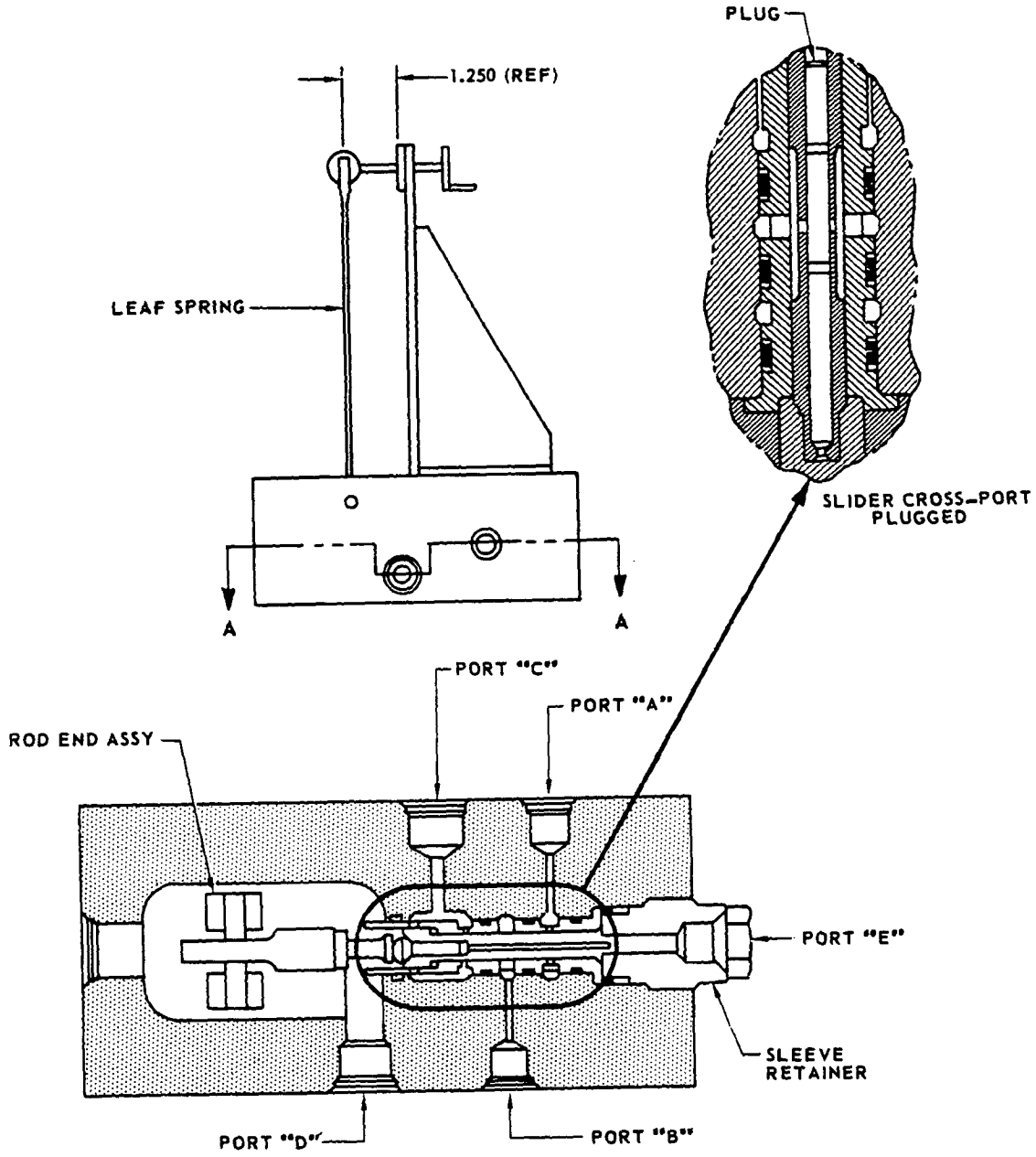
(4) Breakout force shall not exceed 3.2 ounces.



Inner Sleeve and Piston Assembly Test Setup
Figure 701

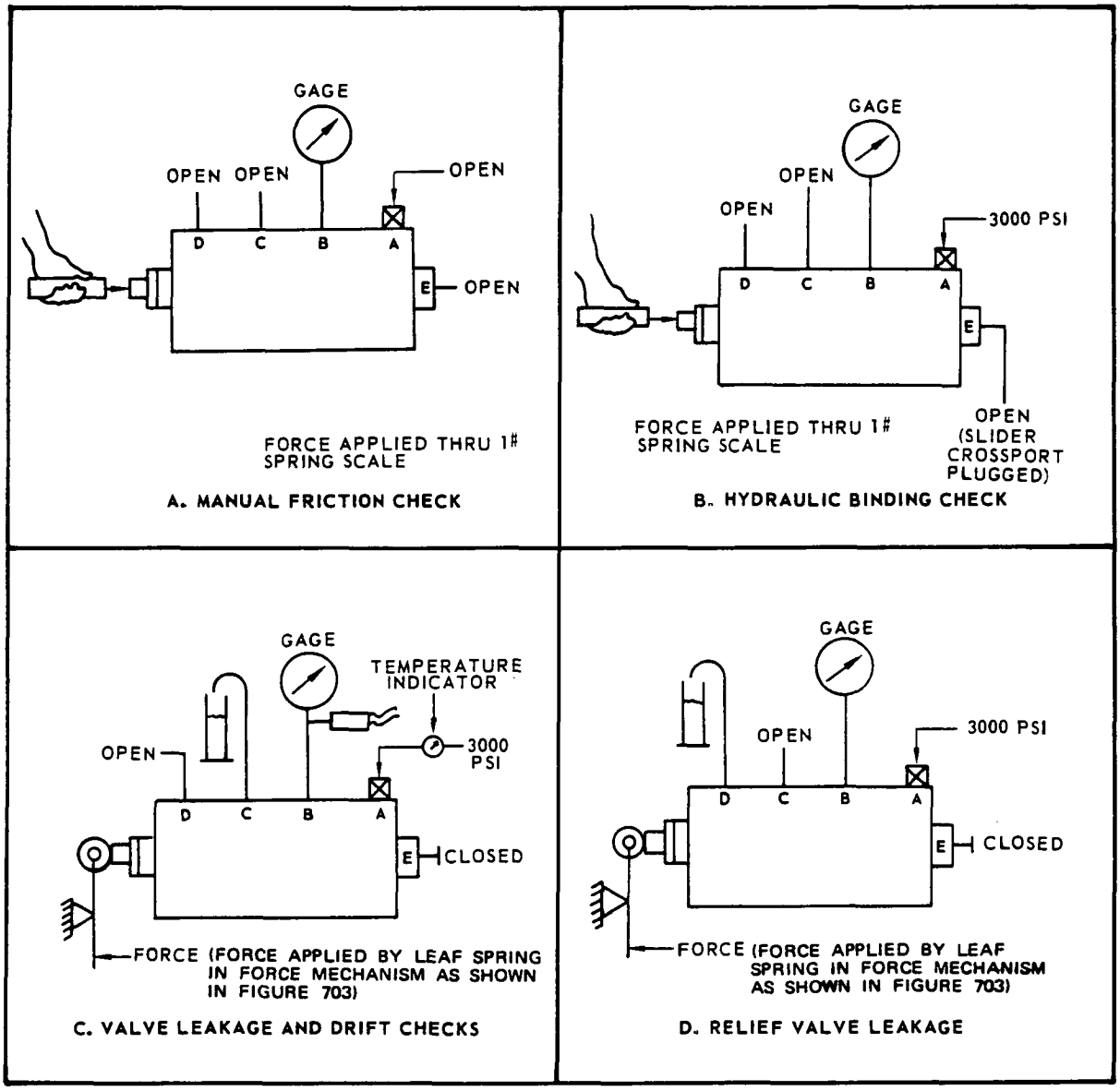


Outer Sleeve and Piston Assembly Test Setup
Figure 702



SECTION A-A

Valve Assembly Test Setup
Figure 703



Test Setup Schematics
Figure 704

B. Hydraulic Binding Test

(1) Set up equipment as shown in diagram B of Fig. 704.

(2) Plug slider crossport with plug as shown in Fig. 703.

(3) Apply 3000-psi source pressure to port A.

(4) Using a 0-16 ounce spring scale, manually stroke the valve through its operating control pressure range, 200-2100 psi, by observing the control pressure gage on port B.

(5) Check for any tendency to stick or bind.

(6) Using the 0-16 ounce spring scale, check that the maximum breakout friction of the valve in both directions of travel does not exceed 8 ounces.

(7) Deleted

(8) Reduce port A pressure to zero.

(9) Remove crossport plug.

C. Valve Leakage Test

NOTE: Initiate all leakage tests not more than 30 seconds after valve has stabilized at required pressure setting.

(1) Set up equipment as shown in diagram C of Fig. 704.

(2) Apply 3000-psi source pressure to port A.

(3) Measure leakage out of return port C while operating statically at control pressure levels of 200, 1500, and 2100 psi.

(4) Check that leakage out return port C does not exceed 300 cc per minute for new or overhauled units, or 1500 cc per minute for units in service.

NOTE: 110 ±10°F test fluid temperature may be used to facilitate testing. If leakage exceeds limits at fluid temperature higher than 100°F, retest unit at 95 ±5°F fluid temperature.

(5) Leakage from return port C shall not be less than that shown below at different fluid temperature.

Minimum Return Port Leakage	Fluid Temperature
55 cc per minute	90-100°F
65 cc per minute	100-110°F
75 cc per minute	110-120°F

(6) Set control pressure level at 1500 psi.

(7) Measure leakage out return port C while rotating slide relative to sleeve in 45 degree (approximate) increments through 135 degrees.

(8) Check that leakage at port C does not exceed limits in step (4). Fluid temperature considerations are as stated in step (5).

(9) Reduce port A pressure to zero.

D. Pressure-Drift Characteristics

(1) Set up equipment as shown in diagram C of Fig. 704.

(2) Apply 3000 psi source pressure to port A.

(3) Observe and record the maximum and minimum control pressure for a period of time not less than 3 minutes for constant pressure demand settings of 200 psi, 1500 psi, and 2100 psi.

(4) Total maximum drift at each pressure setting shall not exceed the following values for the 3 minute period.

Pressure Setting (psi)	Total Max. Pressure Drift (psi)
200	Less than 20
1500	Less than 40
2100	Less than 60

(5) Reduce port A pressure to zero.

E. Relief Valve Leakage

(1) Set up equipment as shown in diagram D of Fig. 704.

(2) Apply 3000 psi source pressure to port A.

(3) Measure leakage from port D while operating statically at control pressure levels of 200 psi and 2100 psi.

(4) The leakage out port D shall not exceed 4.5 cc/minute.

(5) Reduce port A pressure to zero.

7. Hydraulic Control Assembly Test (122, Fig. 1101)

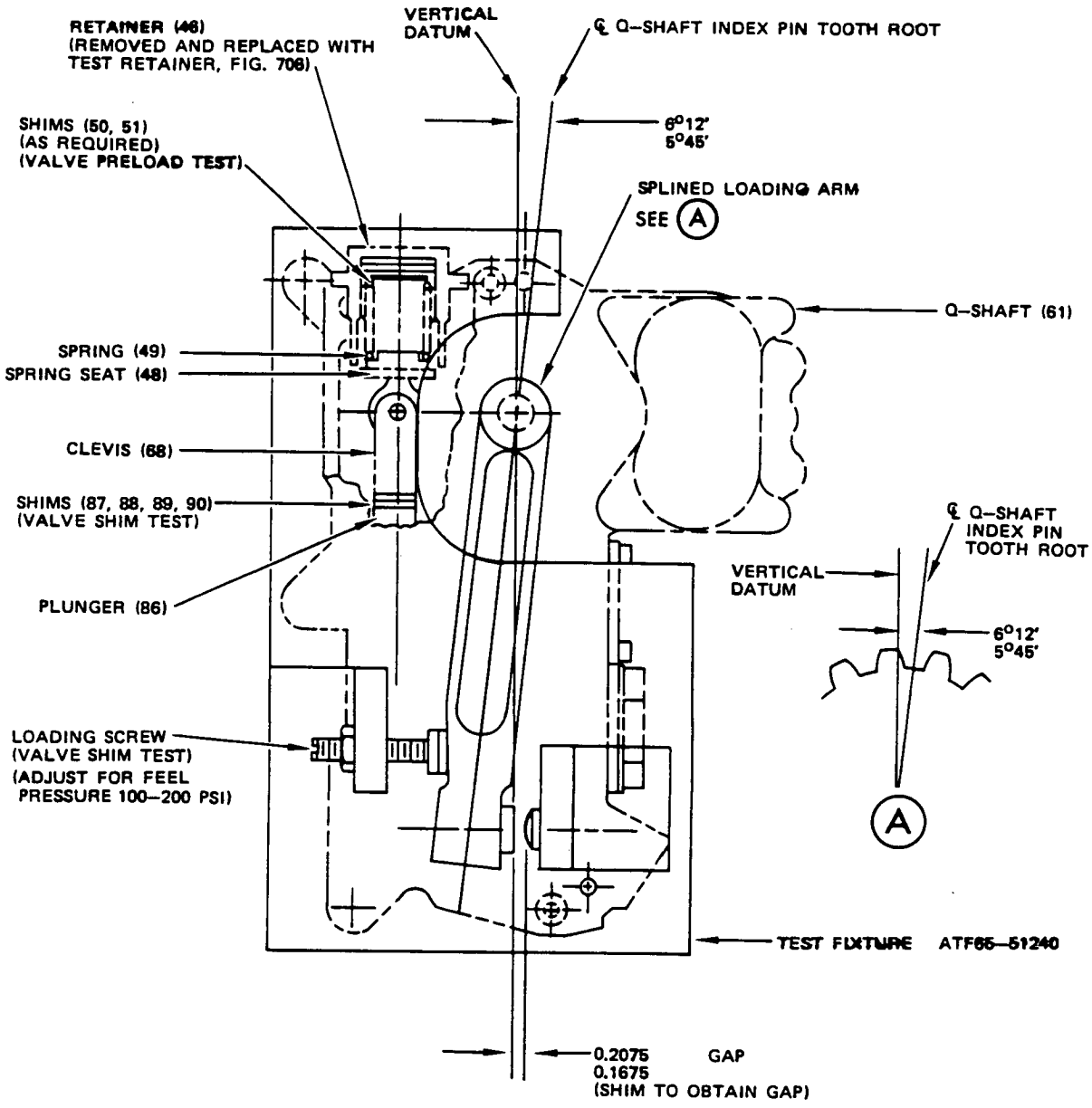
NOTE: The test procedures of par. 4, 5, 6 preceding must be completed before proceeding with the following test procedures.

CAUTION: IF ADJUSTMENT OF SWITCHES (23, 32, FIG. 1102) HAS BEEN CHANGED, THE SWITCHES MUST BE LOOSENED TO PREVENT DAMAGE UNTIL SWITCH RIGGING HAS BEEN COMPLETED PER PAR. G.

A. Proof Pressure Test (Pressure Ports)

(1) Mount hydraulic control assembly (122, Fig. 1101) in test fixture ATF65-51240C78567.

(2) Remove retainers (46, Fig. 1102), springs (49), spring seat (48) and shims (50, 51, 87, 88, 89, 90) (Fig. 705).



NOTE: FOR ITEM NUMBERS REFER TO FIG. 1102

(3) Install test retainers with loading screws (X1E69-39114C78577) shown in figure 706 in place of removed retainers (46). Back out loading screws prior to installation.

(4) Install 0 to 4500 psi pressure gages on system A and system B feel pressure ports. Return ports open. See figure 707 for port locations.

(5) Slowly apply 4500 psi to both system A and system B pressure ports.

(6) Adjust retainer loading screws until the feel pressure on system A is 50 psi maximum and the feel pressure on system B is 4500 psi.

(7) Maintaining 4500 psi on system B feel pressure gage, slowly increase feel pressure on system A to 4500 psi.

(8) Hold 4500 psi on both system A and system B feel pressure gages for three (3) minutes.

(9) Maintaining 4500 psi on system A feel pressure gage, reduce feel pressure on system B to 5 to 25 psi.

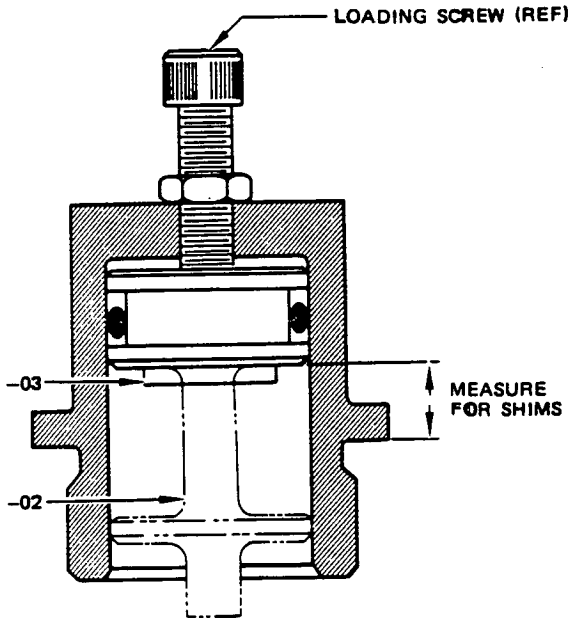
(10) Reduce feel pressure on system A to 5 to 25 psi.

(11) Hold 5 to 25 psi feel pressure on system A and system B for two (2) minutes.

(12) Reduce supply pressure on system A and system B to zero.

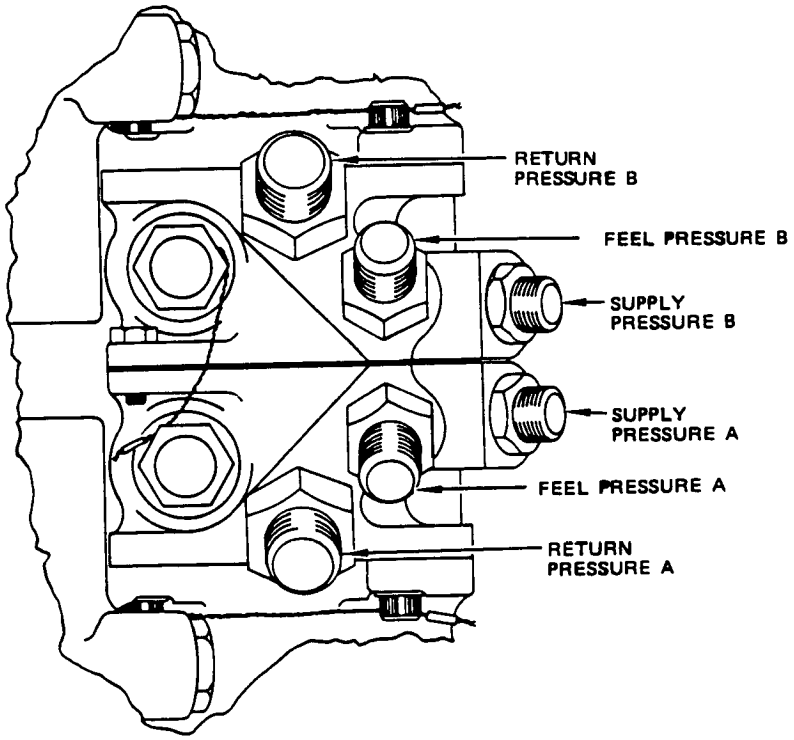
(13) Remove test retainers and leave cavities open for valve shim test.

NOTE: During the above proof tests there shall be no external leakage or permanent set. External leakage does not include normal leakage expected from open ports.



NOTE: USE SHORT PISTON (-03) FOR VALVE PRELOAD TEST PARAGRAPH 8C
USE LONG PISTON (-02) FOR PROOF PRESSURE TESTS PARAGRAPH 8A.

Valve Preload and Proof Pressure Test Retainer
Figure 706



Port Locations
Figure 707

B. Valve Shim Test (Fig. 705)

(1) Install 0 - 4500 psi gages on feel pressure ports. Leave return ports and retainer cavities open.

(2) Install splined loading arms on splined input shafts.

(3) Apply 3000 psi to both system A and system B pressure ports.

(4) Load out backlash by adjusting loading screws until they contact the splined loading arms.

(5) Adjust loading screws until feel pressure on both systems is 150 ±50 psi.

(6) Adjust quantity of shims (87, 88, 89, 90, Fig. 1102) between relief plunger and arm clevis as required to obtain gap of 0.1675 - 0.2075 inch for an angle of 5°45' - 6°12' between centerline of Q-shaft index pin tooth root and vertical datum line. Use minimum quantity of shims possible.

(7) Reduce pressure port pressure to zero.

(8) Remove loading arms.

C. Valve Preload Test (Fig. 705)

(1) Install springs and spring seats (48, 49 Fig. 1102) in hydraulic control assembly (122, Fig. 1101).

(2) Install test retainers XIE69-39114C78577.

(3) Install 0 - 4500 psi pressure gages on system A and system B pressure ports. Leave return ports open.

(4) Slowly apply 3000 psi to both system A and system B pressure ports.

(5) Adjust retainer loading screws until feel pressure on system A and B is 150 ± 5 psi.

(6) Lock loading screws in position with locknuts.

(7) Remove supply pressure to system A and B.

(8) Remove test retainers and measure adjustment required to obtain 150 ± 5 psi preload, as shown in Fig. 706.

(9) Install shims (50, 51, figure 1102) in retainers (46, figure 1102) until their thickness equals the required adjustment of (8) above as near as the shim thickness will allow.

(10) Install retainers (46, figure 1102) with shims. See figure 705.

(11) Apply 3000 psi supply pressure to system A and B pressure ports.

(12) Measure system A and system B feel pressures.

(13) Feel pressure for each system shall be 150 ± 10 psi. If feel pressure is not within tolerance, additional shim adjustment is necessary.

(14) Reduce supply pressure to zero.

(15) Lockwire retainer (46, figure 1102), using double twist method and apply USl identification seal to lockwire.

D. Proof Pressure Test (Return Ports)

(1) Cap supply pressure ports and feel pressure ports.

(2) Apply 2950 to 3000 psi to system A and system B return ports. Hold for three (3) minutes.

(3) Reduce pressure on both return ports to 5 to 25 psi.

(4) Open system A and system B feel pressure ports.

(5) Hold 5 to 25 psi pressure for two (2) minutes.

(6) There shall be no external leakage or permanent set. External leakage does not include normal leakage expected from open ports.

(7) Reduce return port pressures to zero.

E. Valve Leakage Test

(1) Cap system A and system B feel pressure ports with 0 to 3000 psi pressure gages. Return ports open.

(2) Apply 3000 psi pressure to system A and system B pressure ports.

(3) Measure leakage from return port A and return port B while operating statically at feel pressures of 200, 1500, and 2100 psi. Initiate all leakage tests not less than 10 seconds and not more than 30 seconds after pressure has stabilized.

(4) Check that leakage out of either return port does not exceed 300 cc per minute for new or overhauled units, or 1500 cc per minute for units in service.

NOTE: 100 to 120°F fluid temperature may be used to facilitate testing. If leakage exceeds limits at fluid temperature higher than 100°F, retest unit at 95 ±5°F fluid temperature.

(5) Check that leakage out of either return port is not less than that shown below for different fluid temperature.

Minimum Return Port Leakage	Fluid Temperature
55 cc per minute	90-100°F
65 cc per minute	100-110°F
75 cc per minute	110-120°F

(6) Reduce supply pressure to zero.

F. Pressure Differential Switch Leakage Test

(1) Cap system A and system B feel pressure ports.

(2) Cap system A and system B supply pressure ports.

(3) With system B return port open, apply 550 to 600 psi to return port A.

(4) Leakage from return port B shall not exceed 8 cc per minute.

(5) Reduce source pressure to zero.

(6) With system A return port open, apply 550 to 600 psi to return port B.

(7) Leakage from return port A shall not exceed 8 cc per minute.

(8) Reduce supply pressure to zero.

G. Pressure Differential Switch Rigging

(1) Cap feel pressure ports with 0- to 3000-psi pressure gages. Return ports open.

(2) Apply 3000-psi pressure to system A and system B supply pressure ports.

(3) Attach test box, P/N L401-07975, to the pressure differential switch connector (31, figure 1102) and attach 28 volts dc. (See figure 708.)

(4) Apply load to splined loading arms with loading screws (figure 706) until both system A and system B feel pressure gages indicate 600 (± 20) psi.

NOTE: Outer pistons (40, figure 1102) should be fully extended and bottomed.

(5) Move switches (23 and 32, figure 1102) inward until the switch plunger is bottomed.

CAUTION: USE LIGHT FORCE (1 POUND MAXIMUM) ON SWITCHES TO PREVENT DAMAGE TO SWITCH MECHANISM.

(6) Back switches away from piston end 0.005 to 0.015 inch and tighten screws to retain switches.

(7) Insert 0.005-inch thickness feeler stock between switch plunger and piston end. Feeler stock shall pass between switch plunger and piston end easily.

(8) Attempt to insert 0.020-inch thickness feeler stock between switch plunger and piston end. Check that feeler stock does not pass between switch plunger and piston end.

(9) Check that both test box lights are off after rigging of system A and system B switches.

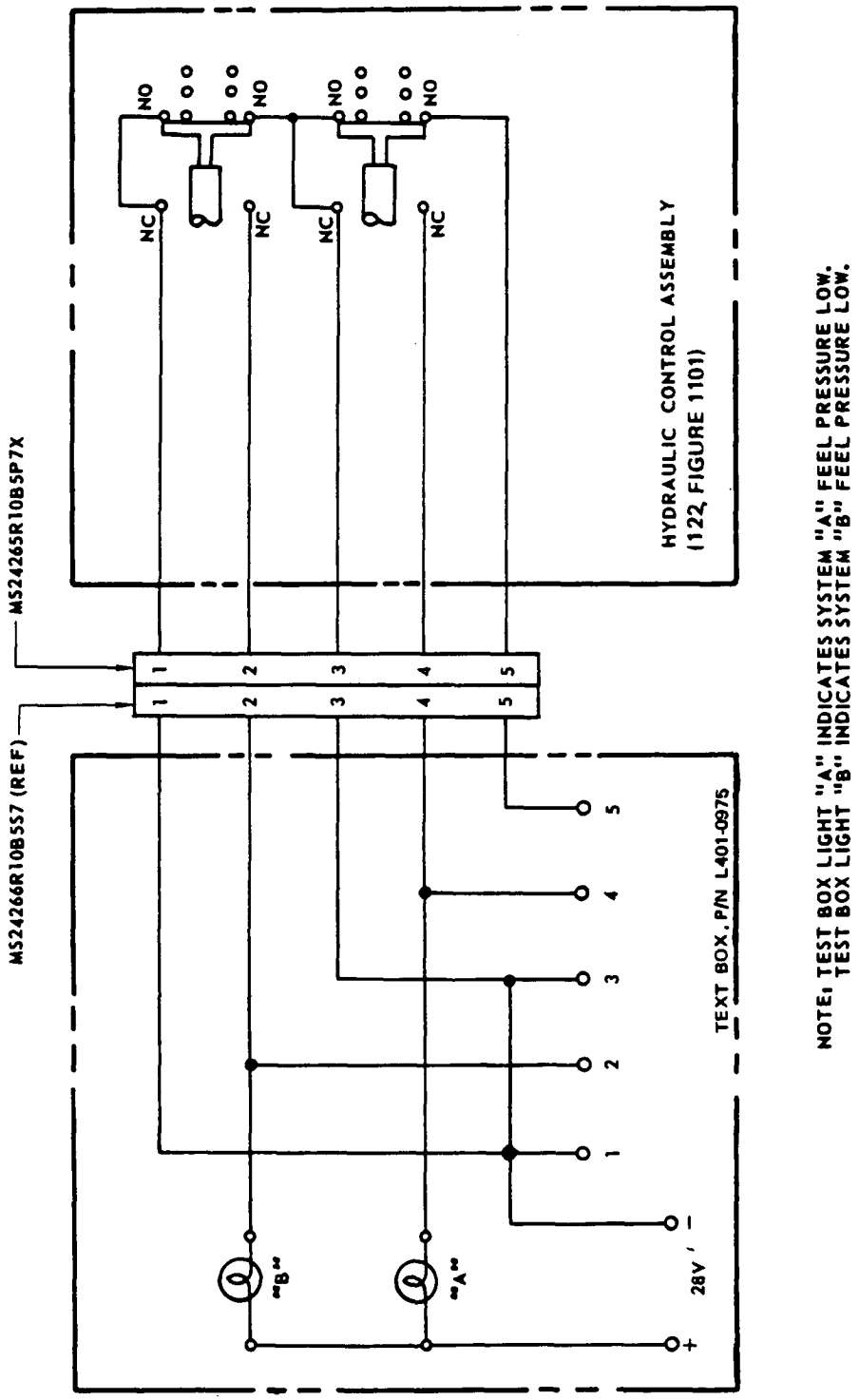
(10) Remove feel pressure from system A.

(11) Check that system A test light on test box illuminates.

(12) Reapply 600 (± 20) psi feel pressure to system A.

(13) Check that the system A test light on the test box is extinguished.

(14) Remove feel pressure from system B.



Differential Pressure Switch Test Setup Schematic
Figure 708

(15) Check that the system B test light on the test box illuminates.

(16) Reapply 600 (± 20) psi feel pressure to system B.

(17) Check that system B test light on the test box extinguishes.

(18) If test lights do not indicate correct switch operation, recheck switch rigging and switch wiring.

(19) Reduce feel pressure on system A and system B to zero.

H. Dielectric Strength Test

(1) Connect the five pins of connector (31, Fig. 1102) together.

(2) Apply a voltage of 1000 volts RMS 60 Hz between the connector pins and the 65-51246-1 housing assembly (112, Fig. 1102) for a period of 1 minute. Voltage shall be applied and removed at a uniform rate of 250 to 500 volts per second.

(3) Check that there is no arcing, flashover or other evidence of failure and that maximum current leakage does not exceed 0.5 milliamperes.

(4) Disconnect the five pins of connector (31, Fig. 1102) previously shorted.

(5) Measure insulation resistance between mutually insulated parts.

(6) Apply 500 volts dc and check that resistances measured are not less than 10 megohms.

NOTE: The dielectric strength test has a cumulative destructive effect. If a unit must be retested without replacement of switches, the succeeding test voltage shall be 80 percent of the previous test voltage.

I. Pressure Differential Switch Test

(1) Connect the test box, P/N L401-07975, as shown in Fig. 708.

(2) Cap system A and system B feel pressure ports with 0- to 3000-psi gages.

(3) Apply 3000-psi pressure to system A and system B supply pressure ports.

(4) Apply 50 ± 5 psi pressure to system A and system B return ports.

(5) Apply load to the splined fixture arms, using the load screws, to raise system A and system B feel pressures to 1200 ± 100 psi.

(6) With the system A feel pressure held at 1200 psi, lower system B feel pressure to 400 ± 50 psi and then raise to 2100 psi. This is one cycle of system B.

(7) Repeat step (6) for a minimum of 50 cycles.

(8) With system B feel pressure held at 1200 psi, lower system A feel pressure to 400 ± 50 psi and then raise to 2100 psi. This is one cycle of system A.

(9) Repeat step (8) for a minimum of 50 cycles.

(10) Adjust system A and system B feel pressures to the first feel pressure test level (480 psi) shown in figure 709.

(11) Slowly lower the system B feel pressure until the system B light on the test box illuminates. The light shall illuminate when the system B feel pressure is within that shown in figure 709 under variable pressure limits - light on (302-390 psi).

(12) Slowly raise system B feel pressure until the system B light on the test box extinguishes. The system B light shall extinguish before the system B feel pressure exceeds that shown in figure 709 under variable pressure limits - light off maximum (402 psi).

(13) Repeat steps (10 through 12) for the remaining feel pressure test levels of figure 709.

(14) Perform steps (10 through 13) with system B feel pressure held steady and system A feel pressure levels varied.

Feel Pressure Test Level (Including 50 psi Return)	Variable Pressure Limits	
	Light On	Light Off (Max)
480 psi	302-390 psi	402 psi
850 psi	602-682 psi	706 psi
1650 psi	1154-1314 psi	1362 psi
2150 psi	1500-1710 psi	1772 psi

Pressure Differential Switch Performance Test
Figure 709

8. Computer Assembly Adjustments and Tests

CAUTION: DO NOT LIFT OR HANDLE COMPUTER BY INPUT ARM AT ANY TIME. FEEL COMPUTER MAY BE DAMAGED IF INPUT ARM IS FORCED TO ROTATE BEYOND INTERNAL STOPS.

A. Computer Assembly - Base Pressure Setting

NOTE: Test procedures of par. 4, 5, 6 and 7 must be completed before proceeding with adjustments and tests.

(1) Install computer assembly in test fixture ATF65-45132C78568 (Fig. 710).

(2) Cap system A feel pressure port with 0- to 3000-psi gage, system A return port open.

(3) Place stabilizer arm full up (+43° 30') (Fig. 710).

(4) Back off bellows preload adjust screw (16, Fig. 1101).

(5) Apply 3000 psi to system A supply pressure port.

(6) The feel pressure shall be 150 ±10 psi.

(7) Adjust bellows preload adjust screw to raise feel pressure to 200 ±10 psi.

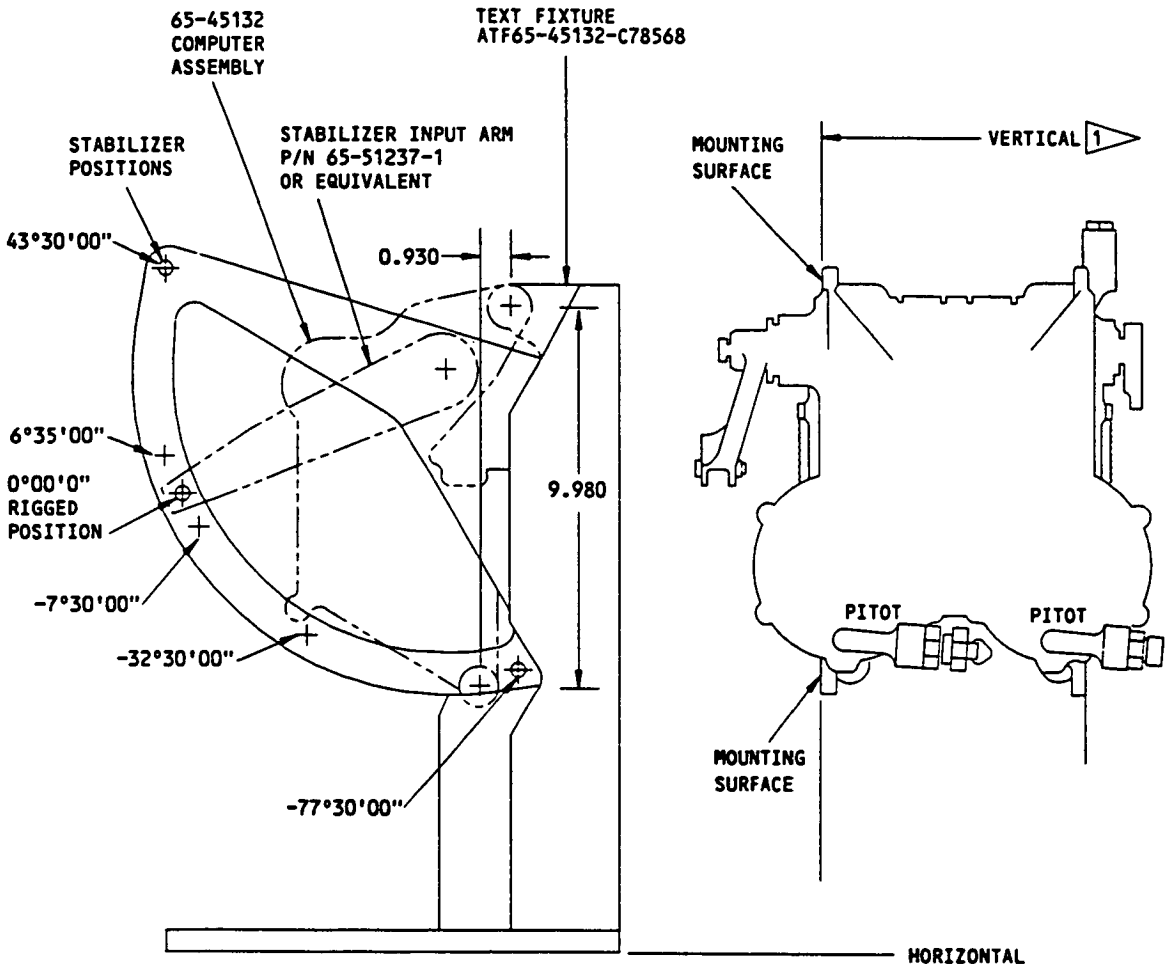
(8) Tighten jamnut (14, Fig. 1101) to required torque.

(9) Stroke bellows piston lightly by hand in both directions and recheck 200 ±10 psi pressure setting.

(10) Lockwire jamnut (14, Fig. 1101) using double-twist method and recheck 200 ±10 psi pressure before sealing lockwire.

(11) Repeat steps (2 thru 10) for system B.

NOTE: If there is insufficient adjustment range during stop screw adjustments required in steps 8.A.(7) and 9.B.(4), recheck the valve shim adjustment by measuring the position of the Q spring as shown in Fig. 711. If additional shim adjustment is required, remove retainer (46, Fig. 1102) and adjust the quantity of shims (50 and 51, Fig. 1102).



1 PLANE MUST BE WITHIN 5 DEGREES. THIS WILL REPRESENT THE MOUNTED ORIENTATION IN A PARKED AIRCRAFT.

Computer Assembly Test Fixture Mounting Orientation
Figure 710

B. Computer Assembly - Rigging

CAUTION: DO NOT EXCEED 10 INCH HG PITOT AIR PRESSURE.

(1) Place stabilizer arm full up (43° 30').

(2) Open static port A.

(3) Apply 10 inch Hg (maximum) to pitot port A.

(4) Adjust the stop screw (71, figure 1101) to limit system A feel pressure to 2100 ± 105 psi.

(5) Tighten jamnut (69, figure 1101) to required torque.

(6) Recheck 2100 ± 105 psi feel pressure.

(7) Lockwire jamnut (69, figure 1101) using double twist method and recheck 2100 ± 105 psi before sealing lockwire.

(8) Repeat steps (1 through 7) for system B.

NOTE: If difficulty is encountered in adjusting the base pressure and/or the 2100 psi stop, check Q-spring rigging per figure 711.

C. Rig Position Adjustment

CAUTION: DO NOT EXCEED 10 INCH HG PITOT AIR PRESSURE.

(1) Place stabilizer arm at -7° 30' position.

(2) Cap system A feel pressure port with 0 to 3000 psi gage.

(3) Apply 4.26 inch Hg air pressure to system A pitot port.

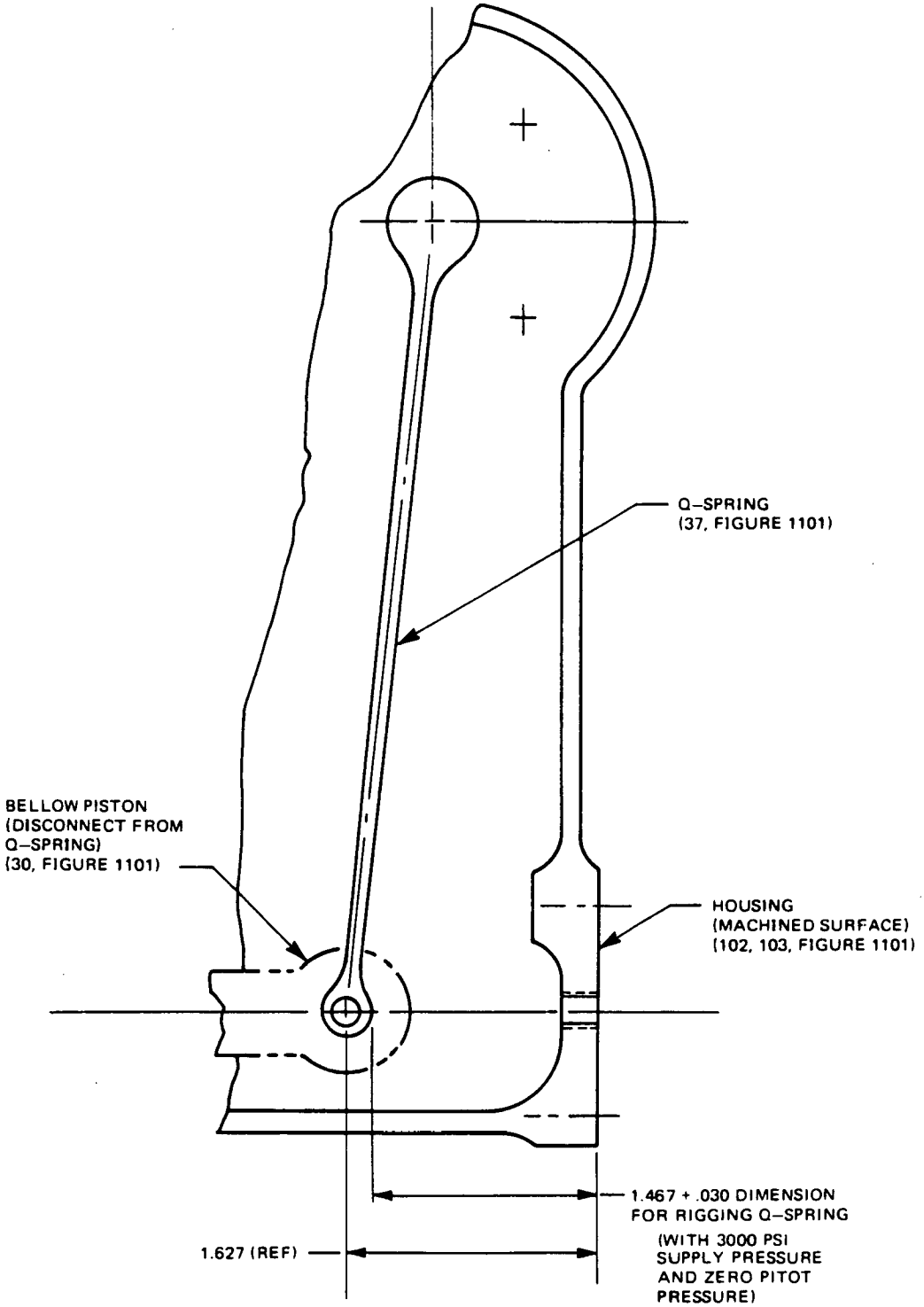
(4) Apply 3000 psi pressure to system A supply pressure port.

(5) Adjust stop screw (46, figure 1101) until system A feel pressure is 799 ± 30 psi.

(6) Tighten jamnut (47, figure 1101) to required torque.

(7) Stroke bellows piston lightly by hand in both directions and recheck 799 ± 30 psi setting.

(8) Repeat steps (1 through 7) for system B. Do not lockwire jamnuts at this time.



Q Spring Position
Figure 711

D. Computer Assembly Run-In

CAUTION: DO NOT EXCEED 10 INCH HG PITOT AIR PRESSURE.

(1) Place stabilizer input arm at +43° 30' position.

(2) Cap system A feel pressure port with 0 to 3000 psi gage.

(3) Apply 3000 psi to system A supply pressure port, system A return port open.

(4) Apply 10 inch Hg air pressure to system A pitot port.

(5) Reduce air pressure to zero.

(6) Repeat steps (4 and 5) a minimum of 50 cycles at a frequency not greater than 1.0 cps.

(7) Repeat steps (2 through 6) for stabilizer arm positions of -7° 30' and -77° 30'

(8) Repeat steps (1 through 7) for system B.

(9) Repeat rig position adjustment (paragraph 9.C.) and lockwire jamnut (47, figure 1101) using double twist method.

E. Proof Pressure and Leakage Test of Pitot and Static Cavity

CAUTION: TO PREVENT DAMAGE TO THE STABILIZER SPRING ARM ASSEMBLY (49, FIGURE 1101), THE TEST FIXTURE STABILIZER INPUT ARM MUST BE RIG-PINNED IN THE FULL UP (43° 30') POSITION FOR ALL TESTS OF THIS PARAGRAPH.

(1) Install bellows assembly covers (1 and 2, figure 1101).

(2) Open system A and system B static ports.

(3) Apply 20 ± 1 inch Hg air pressure to system A pitot port. Hold for two (2) minutes.

(4) There shall be no permanent set or yielding of pitot cavity.

(5) With 20 ± 1 inch Hg air pressure on system A pitot port, block the air supply for two (2) minutes.

(6) Pressure drop shall not exceed 1 inch Hg during this period.

(7) Repeat steps (2 through 4) for system B.

(8) Repeat steps (5 and 6) for system B.

CAUTION: TO PROTECT BELLOWS DIAPHRAGM FROM DAMAGE, PRESSURE MUST BE APPLIED TO BOTH PITOT PORTS PRIOR TO APPLYING PRESSURE TO EITHER STATIC PORT. NEVER APPLY PRESSURE TO THE STATIC SIDE OF THE DIAPHRAGM GREATER THAN THE PRESSURE ON PITOT SIDE.

(9) Cap system B static port.

(10) Apply 20 ± 1 inch Hg air pressure to system A and system B pitot ports.

(11) Apply 20 ± 1 inch Hg air pressure to system A static port. Hold for two (2) minutes.

NOTE: Both static cavitites are ported together internally.

(12) There shall be no permanent set or yielding of static cavities.

(13) Block the air supply for two (2) minutes and note pressure drop.

(14) Pressure drop during the two (2) minute period shall not exceed 4 inch Hg.

(15) Reduce pressure to zero.

F. Valve Leakage Test

(1) Cap system A and system B feel pressure ports with 0 to 3000 psi pressure gages. Return ports open.

(2) Apply 3000 psi pressure to system A and system B pressure ports.

(3) Measure leakage from return port A and return port B while operating statically at feel pressures of 200 psi, 1500 psi and 2100 psi. All leakage tests shall be initiated not less than 10 seconds and not more than 30 seconds after pressure has stabilized.

(4) Leakage out of either return port must not exceed 300 cc per minute for new or overhauled units, or 1500 cc per minute for units in service.

NOTE: 100 to 120°F source fluid temperature may be used to facilitate testing. If leakage exceeds limits at fluid temperature higher than 100°F, retest unit at 95 ±5°F fluid temperature.

(5) The leakage out of either return port shall not be less than that shown below for different fluid temperature.

Minimum Return Port Leakage	Fluid Temperature
55 cc per minute	90-100°F
65 cc per minute	100-110°F
75 cc per minute	110-120°F

(6) Reduce supply pressure to zero.

G. Computer Performance Test

(1) Set up equipment as shown in Fig. 712.

(2) Calibrate pressure transducers for ranges shown in Fig. 713.

NOTE: To improve performance it is permissible to vibrate the computer assembly at a level not to exceed 2 G's or 0.005-inch double amplitude. Vibration of 1.5 G at 100 Hz is recommended.

(3) Pressure-Drift Test

(a) Apply 3000-psi pressure to system A supply pressure port.

(b) Place stabilizer arm at the 43°30' position.

(c) The system A feel pressure should be 200 ±10 psi (base pressure).

(d) Plot or record from gage, feel pressure drift versus time for constant feel pressure demand of 200, 1500 and 2100 psi.

(e) Total maximum drift in pressure at each pressure setting for a period of time not less than 3 minutes shall not exceed the following values for the 3 minute period.

Feel Pressure (PSI)	Total Max Pressure Drift (PSI)
200	Less than 30
1500	Less than 50
2100	Less than 70

(f) Repeat steps (a thru e) of pressure-drift test for system B.

(4) Performance Plots (See Fig. 712 for equipment setup.)

(a) Deleted

(b) Open system A static port.

(c) Place stabilizer input arm in 43° 30' position (Fig. 710).

(d) Apply 3000 psi to system A supply pressure port and maintain 25-35 psi at system A return port.

(e) Slowly apply air pressure to system A pitot port and record continuous plot of feel pressure versus air pressure as shown in Fig. 713. Record performance up to but not exceeding 10 inches Hg.

(f) Performance shall be within tolerance bands shown in Fig. 713.

NOTE: 50 psi return pressure may be applied to the computer only if required to activate the computer valve damper for improved performance plots; however, care must be exercised to calibrate the X-Y plotter feel pressure scale for feel pressure minus return pressure. For accurate results, the return pressure must be maintained as constant as possible with a maximum variation of ±5 psi.

(g) Repeat performance plot steps (a thru f) for the 6° 35', 1° 00', -7° 30', -32° 30' and -77° 30' stabilizer arm positions.

(h) Repeat performance plot steps (a thru g) for system B.

H. Pressure Differential Switch Performance

(1) Attach test box P/N L401-07975 to computer assembly switch connector and to 28 volt dc source as given in figure 708.

(2) Cap system A and system B feel pressure ports with 0- to 3000-psi gages.

(3) Apply 50 (± 5)-psi pressure to system A and system B return ports.

(4) Apply 3000-psi pressure to system A and system B supply pressure ports.

(5) Uncap system A and system B static ports.

(6) Adjust system A and system B feel pressures to the first feel pressure test level (480 psi) shown in figure 709 by applying air pressure to system A and system B pitot ports.

(7) Slowly lower system B feel pressure until system B light on the test box illuminates. Check that the light illuminates when system B feel pressure is within that shown in figure 709 under variable pressure limits - light on (302-390 psi).

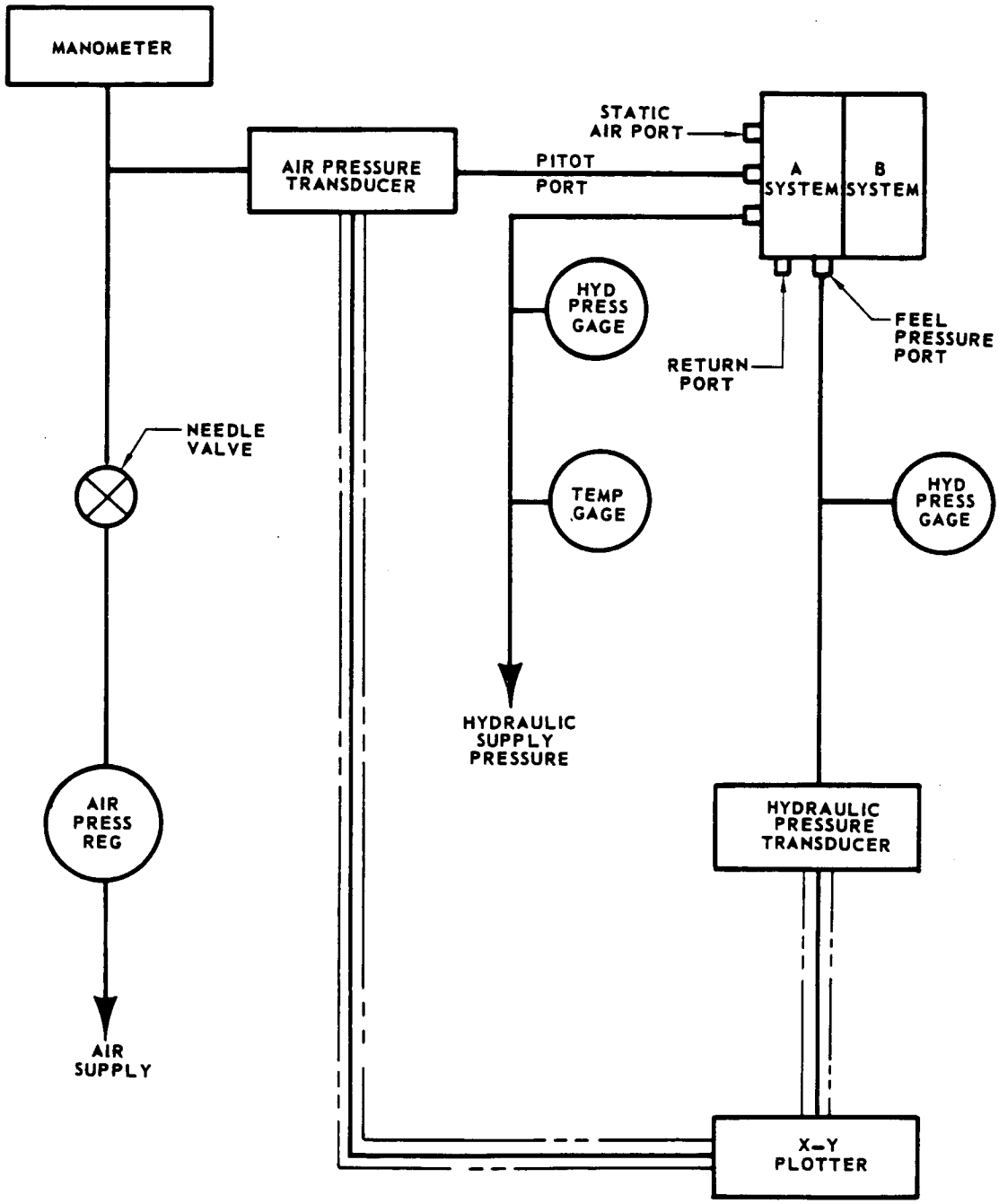
(8) Slowly raise system B feel pressure until the system B light on the test box extinguishes. Check that the system B light extinguishes before the system B feel pressure exceeds that shown in figure 709 under variable pressure limits - light off maximum (402 psi).

(9) Repeat steps (6 through 8) for the remaining feel pressure test levels of figure 709.

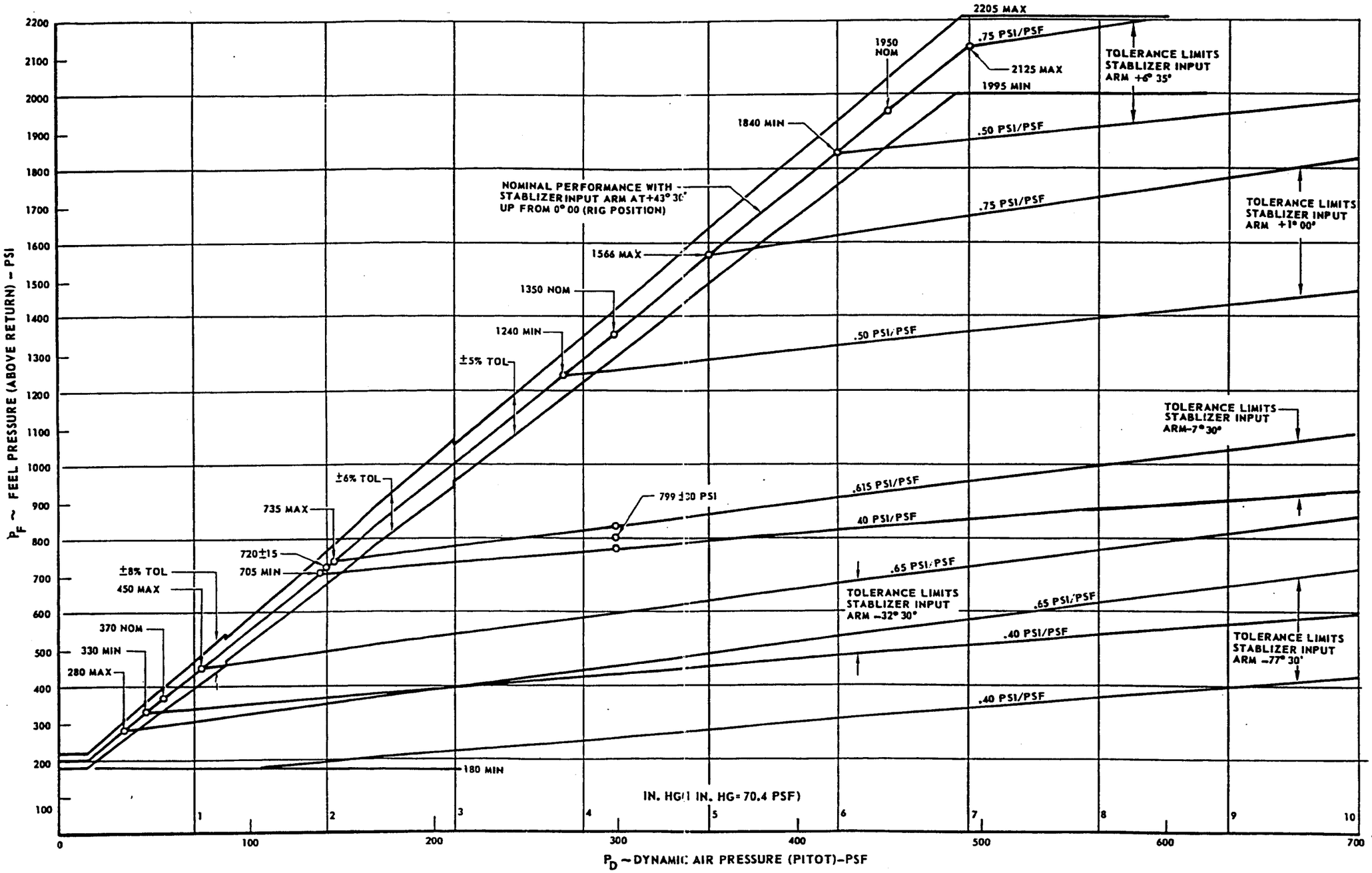
(10) Perform steps (6 through 9) with system B feel pressure held steady and system A feel pressure levels varied.

(11) Reduce pitot pressure and supply pressure to zero.

(12) Complete assembly of computer per par. 3.U. of ASSEMBLY.



Computer Performance Test Schematic
Figure 712



Computer Performance
Figure 713

TROUBLE SHOOTING

1. Trouble during test after overhaul of sleeve and piston assembly (107, figure 1102).

	Trouble	Possible Cause	Correction
A.	Excessive leakage from port B or D	Improper fit due to wear or damage	Replace assembly (107)
B.	Excessive breakout friction	Binding due to contamination	Disassemble and clean
		Binding due to wear or damage	Replace assembly (107)

2. Trouble during test after overhaul of sleeve and piston assembly (38, figure 1102).

	Trouble	Possible Cause	Correction
A.	Excessive leakage from port D	Improper fit due to wear or damage	Replace assembly (38)
B.	Excessive breakout friction (10 grams force)	Binding due to contamination	Disassemble and clean
		Binding due to wear or damage	Replace assembly (38)
C.	Excessive breakout friction (400 grams force)	Binding due to contamination	Disassemble and clean
		Insufficient run-in	Run-in per ASSEMBLY, paragraph 2.N.(2)
		Damaged O-ring or cap strip	Replace O-ring (42) and cap strip (43)

3. Trouble during test after overhaul of valve assembly (80, figure 1102).

	Trouble	Possible Cause	Correction
A.	Excessive breakout friction (no hydraulic pressure applied)	Contamination	Disassemble and clean
		Improper fit due to wear or damage	Replace valve assembly (80)
B.	Excessive breakout friction under hydraulic pressure	Hydraulic binding	Replace valve assembly (80)
C.	Excessive leakage from port C	Improper fit due to wear or damage	Replace valve assembly (80)
D.	Excessive pressure drift	Contamination	Disassemble and clean
		Hydraulic binding	Replace valve assembly (80) or relap per REPAIR paragraph 1.C.
E.	Excessive relief valve leakage from port D	Improper relief valve seat	Replace poppet (83) or valve assembly (80)

4. Trouble during test after overhaul of hydraulic control assembly (122, figure 1102).

	Trouble	Possible Cause	Correction
A.	Evidence of permanent set, distortion or external leakage	O-ring failure	Replace O-rings (77)
		Structural weakness	Replace distorted part or parts
B.	Excessive leakage from return ports	O-ring failure	Replace O-rings (84)
		Improper fit due to wear	Replace valve assembly (80)
C.	Excessive inter-system leakage from return ports	Wear or damage to lap fit on inner piston sleeve assy of the differential control operator	Replace sleeve and piston assembly (107)
D.	Arcing, flashover, or other evidence of failure	Faulty wiring, insulation or switch	Replace wiring or switch (23, 32)
E.	Insufficient resistance between mutually insulated parts	Faulty wiring, insulation or switch	Replace wiring or switch (23, 32)
F.	Indicator lamp does not illuminate within acceptable feel pressure limits	Improper switch adjustment	Adjust switch (23, 32) per TESTING, paragraph 7.G.
		Faulty switch mechanism	Replace switch (23, 32)
		Binding of differential pressure operators due to contamination	Readjust Disassemble and clean
		Binding of differential pressure operators due to damage	Replace sleeve and piston assemblies (38), or cap strips (43) and O-rings (42)

Trouble	Possible Cause	Correction
G. Feel pressure not within limits	Preload adjustment of feel force valve assembly incorrect	The preload on each valve in the feel force valve assembly shall be adjusted as required (180 psi min. to 220 psi max.) to meet performance limits. Replace valve assy if necessary
	Pressure-force characteristics of valve improper	

5. Trouble during test after overhaul of computer assembly. (See figure 1101.)

Trouble	Possible Cause	Correction
A. Evidence of permanent set or yielding (pitot cavity)	Structural weakness	Replace distorted part or parts
B. Excessive pressure drop (pitot cavity)	Diaphragm failure	Replace diaphragm (27)
	Bellows cap screws loose	Tighten screws (10) to proper torque value
	Bellows cap damaged	Replace bellows cap (9)
	Faulty bellows cap gasket	Replace gasket (12)
	Faulty piston to diaphragm seal	Replace piston cap (26) or diaphragm (27) and/or tighten bellows screws (24) to proper torque value
	O-ring failure	Replace O-rings (8 and 19)
C. Evidence of permanent set or yielding (static cavity)	Structural weakness	Replace distorted part or parts

	Trouble	Possible Cause	Correction
D.	Excessive pressure drop (static cavity)	Faulty O-rings at static fitting, seals between housing assembly and hydraulic assembly, camshaft seals, stab shaft seals	Replace O-rings (73, 120, 121, 117, 90, 94)
		Faulty gaskets at side covers, 2100 psi stop adjust covers screw sealing washer	Replace gaskets (6, 68, 5). Tighten screws (3) to proper torque value
		Distorted housings or covers	Replace distorted parts
E.	Excessive leakage from return ports	O-ring failure	Replace O-rings (84)
		Improper fit due to wear or binding	Replace valve assembly (80)
F.	Excessive pressure drift	Contamination	Disassemble and clean valve assembly (80)
		Hydraulic binding	Replace valve assembly (80) or relap per REPAIR, paragraph 1.C.
		Excessive linkage friction	Check all bearings and replace as required
G.	Computer performance not within allowable limits; feel pressure incorrect at zero pitot pressure	Improper adjustment of fitting assembly	Readjust fitting assy (16) per TESTING, paragraph 8.A.
H.	Feel pressure incorrect at low dynamic pressure	Improper adjustment of hydraulic base pressure	Readjust base pressure by changing shim stock (50, 51, figure 1102) per TESTING, paragraph 7.C.

	Trouble	Possible Cause	Correction
I.	Slope of feel pressure curve not within limits	Incorrect valve diameter due to wear	Replace valve assy (80, figure 1102)
		Improper base pressure setting	Readjust base pressure by changing shim stock (50, 51, figure 1102) per TESTING, paragraph 7.C.
J.	Maximum feel pressure not within limits of the tolerance band	Incorrect 2100 psi stop adjustment	Reset stop screw (71, figure 1101) per TESTING, paragraph 8.B.
K.	Plot of feel pressure curve shows stabilizer input breakover not within limits of tolerance band	Improper adjustment of cam follower	Reset adjusting screw (46, figure 1101) per TESTING, paragraph 8.C.
L.	Excessive hysteresis, excessive waviness of plot	Contamination or hydraulic binding	Clean or replace valve assy (80, figure 1102)
		Mechanical binding	Replace any binding detail parts
M.	Indicator lamp does not illuminate with allowable feel pressure limits	Improper adjustment of switches	Adjust switches (23, 32, figure 1102) per TESTING, paragraph 7.G.
		Faulty switch	Replace switch (23, 32, figure 1102)
		Excessive friction due to improper seal installation or binding, or poor sleeve-piston cap fit of differential operators	Check seals per TESTING, paragraph 4.B. and 5.B. Replace O-rings (42, figure 1102) if required. Replace assemblies (38, 107, figure 1102) if required

STORAGE INSTRUCTIONS

1. After tests have been completed, prepare unit for storage.

   A. Fill all hydraulic ports in the hydraulic control assembly (122, Fig. 1101) with BMS 3-11 hydraulic fluid.

   B. Cap hydraulic ports with caps (11, 14 and 17, Fig. 1102) with a minimum loss of fluid.

   C. Install dust cap (27, Fig. 1102) on connector (31, Fig. 1102).

      NOTE: Although 65-45132-5, -7, -8 configurations include shipping sleeve (98) instead of input arm (98), installation of arm in place of sleeve is recommended to provide improved method of restraint by use of safety pin (Ref par. 3.K.(6) of ASSEMBLY).

   D. On assemblies 65-45132-5, -7 and -8, install shipping sleeve (98, Fig. 1101) on camshaft assembly (81) and secure with washer (97) and plug (96). Tighten plug to 25-50 lb-in. On assembly 65-45132-9 secure input arm assembly (98) with safety pin (124).

      CAUTION: DO NOT LIFT OR HANDLE COMPUTER BY INPUT ARM (98) AT ANY TIME OR ROTATE INPUT ARM AGAINST CAM STOPS AS ANY TORQUE EXCEEDING 300 LB-IN. APPLIED TO ARM MAY CAUSE DAMAGE TO CAMSHAFT SHEAR PINS.

   E. Tag or mark with test date.

   F. Place unit in a heavy gauge plastic bag.

   G. If stored for a long period of time, place packaged unit in a cushioned container.

   H. Seal container and mark with assembly part number, serial number, and test date on container exterior.

   I. For further information, refer to 20-44-02.

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

NOTE: Equivalent substitutes may be used for listed items.

1. Computer Assembly (Fig. 1101)

	Description/ Part Number	Nomenclature	Use
A.	1.0 gpm of fluid at 4450-4550 psi through a regulated system	Hydraulic Test Stand	Supply hydraulic pressure and regulated flow for testing computer
B.	Filtering capability of 10 microns nominal, 25 microns absolute	Inline Filter	Protect components of computer unit from contamination during testing
C.	ATF65-45132C78568 *[1]	Test Fixture	Provide support and connection for computer during test
D.	0-20 in.Hg	Mercury Manometer	Check leakage of pitot and static cavities
E.	Model HP7090A *[2]	X-Y Plotter	Plot performance characteristics of computer during testing
F.	Deleted		
G.	Deleted		
H.	0-3000 psi hydraulic pressure ±1/4% of full scale	Pressure Transducer (Hydraulic)	Input to plotter during computer performance test

	Description/ Part Number	Nomenclature	Use
I.	0-10 in. Hg ±1/4% of full scale	Pressure Transducer (Pneumatic)	Input to plotter during computer performance test
J.	28 volts DC nominal	DC Power Supply	Provide voltage for pressure differential switch
K.	L401-07975 *[1]	Test Box	Indicate of limits during testing of differential pressure switch
L.	XIE69-39122C78575	Spanner Wrench	Install camshaft retainers (79, 80, Fig. 1101)
M.	F80252-1	Seal Installation Set	Install O-ring (90) and cap ring (91) in housing assembly (107)

2. Sleeve and Piston Assy (107, Fig. 1102)

	Description/ Part Number	Nomenclature	Use
A.	TB69-39147-1C78608 *[1]	Test Block	House and provide hydraulic connection to assy during test
B.	0-50 grams in maximum increments of 5 grams	Spring Scale	Measure breakout friction during tests

3. Sleeve and Piston Assy (38, Fig. 1102)

	Description/ Part Number	Nomenclature	Use
A.	TB69-39149-1C78609	Test Block	House and provide connections to assy during test
B.	0-16 oz ±2% of full scale	Spring Scale	Measure breakout friction during tests

4. Valve Assembly (80, Fig. 1102)

	Description/ Part Number	Nomenclature	Use
A.	401-09169-1C78599 *[1]	Test Block	House valve during test

5. Hydraulic Control Assembly (122, Fig. 1102)

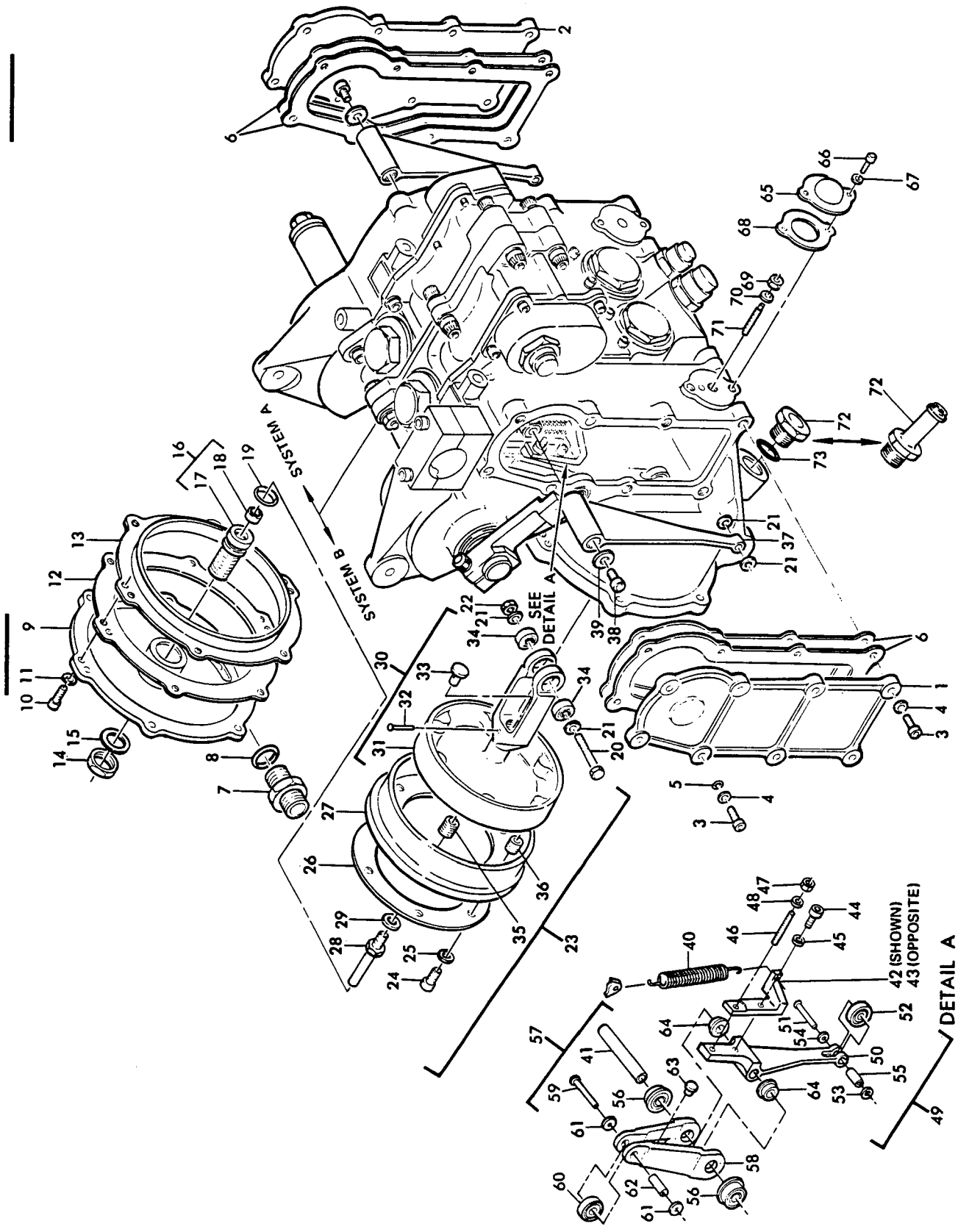
	Description/ Part Number	Nomenclature	Use
A.	ATF65-51240C78567 *[1]	Test Fixture	House assembly and provide connections during testing
B.	XIE69-39114C78577 *[1]	Retainers and Piston	Perform valve shim test and proof pressure test
C.	L401-07975 *[1]	Test Box	Indicate of limits during testing of differential pressure switch
D.	XIE65-51228C78576 *[1]	Square O-ring Installation Tool	Install O-ring (57, Fig. 1102)
E.	Capable of supplying and removing 1500 volts RMS, 60 Hz at uniform rate of 250-500 volts/sec and capable of measuring 10 megohms resistance	High Voltage Tester	Apply high voltage for dielectric strength tests

*[1] E-Systems, Montek Division, 2268 South 3270 West, Salt Lake City, Utah 84111

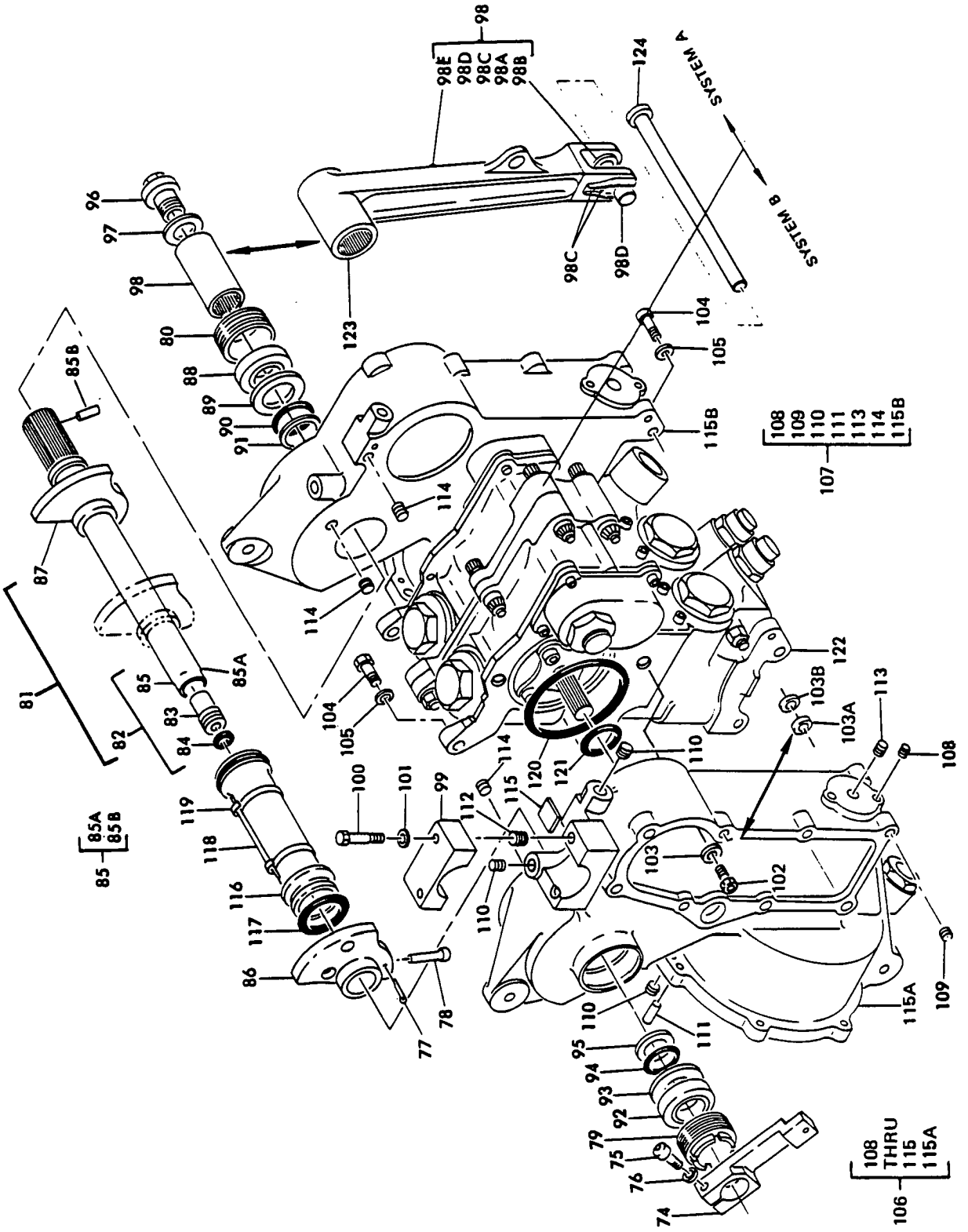
NOTE: Part numbers shown are formerly from LTV Electrosystems, Inc.

*[2] Hewlett Packard Co., 1501 Page Mill Rd., Palo Alto, California 94309

ILLUSTRATED PARTS LIST



Computer Assembly
Figure 1101 (Sheet 1)



Computer Assembly
Figure 1101 (Sheet 2)

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
	65-45132-5		COMPUTER ASSY	A	RF
	65-45132-7		COMPUTER ASSY (SB 27-1014)	B	RF
	65-45132-8		COMPUTER ASSY	C	RF
	65-45132-9		COMPUTER ASSY (SB 27-1038)	D	RF
	65-45132-10		COMPUTER ASSY (SB 27-1062)	E	RF
	65-45132-11		COMPUTER ASSY	F	RF
	65-45132-12		COMPUTER ASSY	G	RF
1	65-51224-1		. COVER, LH		1
2	65-51224-2		. COVER, RH		1
3	NAS1352-08H8P		. SCREW		16
4	AN960PD8		. WASHER		16
5	NAS1611-007		. PACKING, O-RING		2
6	69-39133-1		. GASKET, COVER		4
7	MS21902D6		. UNION		2
8	NAS1612-6		. PACKING, O-RING		2
9	65-51220-1		. CAP, BELLOWS		2
10	NAS1351-3H8P		. SCREW		6
11	NAS620A10L		. WASHER		6
12	69-39132-1		. GASKET		2
13	65-51235-1		. GUIDE, BELLOWS		2
14	66-24400-1		. NUT		2
15	AN960PD916L		. WASHER		2
16	69-39100-1		. FITTING ASSY, BELLOWS PRELOAD ADJ		2
17	69-39100-2		. . FITTING		1
18	AJ04S101		. . BEARING, V50294 (BOEING 10-60516-104)		1
18	BJC8TA12-7A		. . BEARING, V21335 (BOEING 10-50516-104)		1
18	DBS4-103		. . BEARING, V81376 (BOEING 10-60516-104)		1
18	KJN4-13		. . BEARING, V97613 (BOEING 10-50516-104)		1
18	NH04-210S		. . BEARING, V15860 (BOEING 10-60516-104)		1
18	PBR04C07BAC		. . BEARING, V73134 (BOEING 10-60516-104)		1
18	YTS200		. . BEARING, V77896 (BOEING 10-60516-104)		1
18	90291		. . BEARING, V09455 (BOEING 10-60516-104)		
19	NAS1611-112		. PACKING, O-RING		2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
20	69-39112-1		. BOLT		2
21	69-39101-1		. WASHER		8
22	BACN10JC3		. NUT (REPLS NAS679A3)		2
23	69-39130-1		. BELLOWS ASSY		2
24	NAS1352-08H6P		. . SCREW		6
25	NAS620A8L		. . WASHER		6
26	69-39131-1		. . CAP, PISTON		1
27	65-51239-1		. . DIAPHRAGM		1
28	69-39102-1		. . ROD, GUIDE		1
29	AN960PD416L		. . WASHER		1
30	65-51221-1		. . PISTON ASSY		1
31	65-51221-2		. . . PISTON		1
32	MS20470D2-10		. . . RIVET		1
33	66-24402-1		. . . PIN, STOP		1
34	SR3PPK13/MIL-G-3278		. . . BEARING, V83086		2
35	MS21209F4-15		. . . INSERT		1
36	MS21209C0815		. . . INSERT		6
37	65-51227-1		. Q-SPRING		2
38	NAS1351-3LN6		. SCREW		1
39	CVC754-232S13		. WASHER, V97871		1
40	69-39136-1		. SPRING, PRELOAD		2
41	66-24405-1		. SHAFT, PIVOT		2
42	65-51243-1		. BRACKET, PRELOAD SPRING (LH)		1
43	65-51243-2		. BRACKET, PRELOAD SPRING (RH)		1
44	NAS1352-06H6P		. SCREW		1
45	NAS620A6		. WASHER		1
46	69-39118-2		. SCREW		1
47	CVC1152-3		. NUT, V97871		1
48	AN960PD10L		. WASHER		1
49	65-51230-1		. ARM ASSY, STAB SPRING		2
50	65-51230-2		. . ARM		1
51	MS20427M3-12		. . RIVET		1
52	BACB10A329		. . BEARING		1
53	69-39101-5		. . WASHER		1
54	69-39101-4		. . WASHER		1
55	69-39105-2		. . SPACER		1
56	FR4PPK13/MIL-G-23827		. BEARING, V83086 (PREF)		4
56	FR4ZZRA7P13 LG54		. BEARING, V83086 (OPT)		4
57	65-51231-1		. ARM ASSY, CAM FOLLOWER		2
58	65-51231-2		. . ARM		1
59	MS20615-3M12		. . RIVET		1

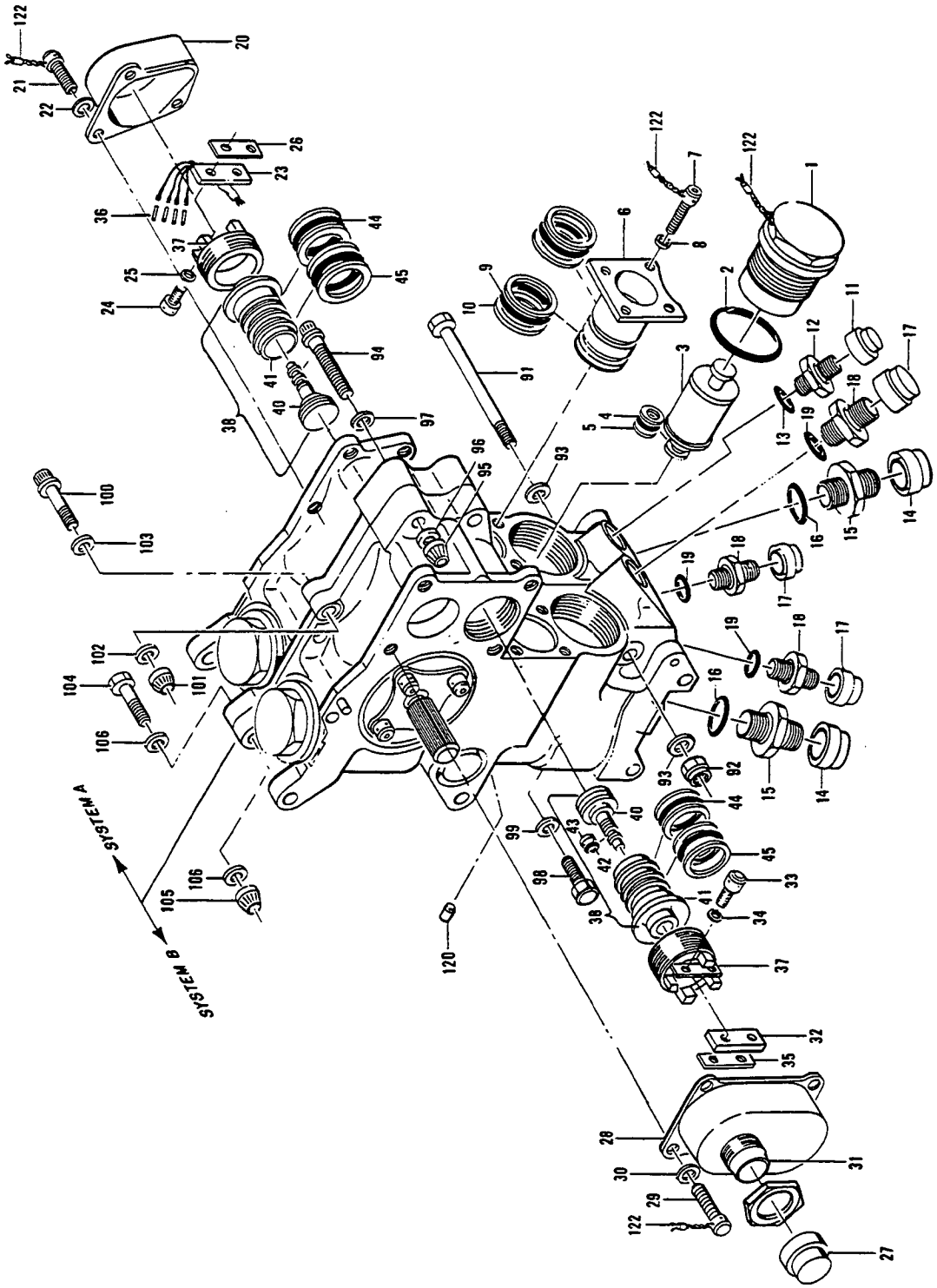
FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
60	BACB10A329		. . BEARING		1
61	69-39101-6		. . WASHER		2
62	69-39105-3		. . SPACER		1
63	66-24402-2		. . PIN		1
64	NAS538-4P22		. . BUSHING		2
65	69-39119-1		. COVER, STOP		2
66	NAS1352-06H4P		. SCREW		2
67	NAS620A6		. WASHER		2
68	69-39120-1		. GASKET		2
69	CVC1152-3		. NUT, V97871		2
70	AN960PD10L		. WASHER		2
71	69-39118-1		. SCREW		2
72	69-35948-1		. FITTING, STATIC	AB	2
72	69-54684-1		. FITTING, STATIC	C-G	2
73	NAS1612-6		. PACKING, O-RING		2
74	69-39139-1		. ARM, DRIVE, POT	A-D	1
75	NAS1351-4H16P		. SCREW	A-D	1
76	NAS620A416L		. WASHER	A-D	1
77	MS24665-132		. PIN, COTTER		2
78	66-24404-1		. PIN, SHEAR		2
79	69-39123-1		. RETAINER		1
80	69-39122-1		. RETAINER		1
81	65-51232-5		. CAM AND SHAFT ASSY	A-EG	1
81	65-51232-10		. CAM AND SHAFT ASSY	F	1
82	65-51232-6		. . SHAFT AND PLUG ASSY		1
83	69-39121-1		. . . PLUG		1
84	NAS1611-110		. . . PACKING, O-RING		1
85	65-51233-1		. . . CAMSHAFT ASSY		1
85A	65-51233-2		. . . . SHAFT, CAM		1
85B	65-51233-3		. . . . PIN		1
86	65-51232-8		. . CAM	A-EG	1
86	65-51232-12		. . CAM	F	1
87	65-51232-7		. . CAM	A-EG	1
87	65-51232-11		. . CAM	F	1
88	MB540DDE6531		. BEARING, V21335 (SUPSD BY BACB10AS14)		1
88	BACB10AS14		. BEARING (SUPSDS MB540DDE6531)		1
89	69-39124-3		. RETAINER, SEAL		1
90	BACP11W214		. PACKING, O-RING		1
91	BACR12AT214		. RING, CAP		1
92	MB539DDE6531		. BEARING, V21335 (SUPSD BY BACB10AS12)		1
92	BACB10AS12		. BEARING (SUPSDS MB539DDE6531)		1
93	69-39124-2		. RETAINER, SEAL		1
94	BACP11W116		. PACKING, O-RING		1
95	BACR12AT116		. RING, CAP		1

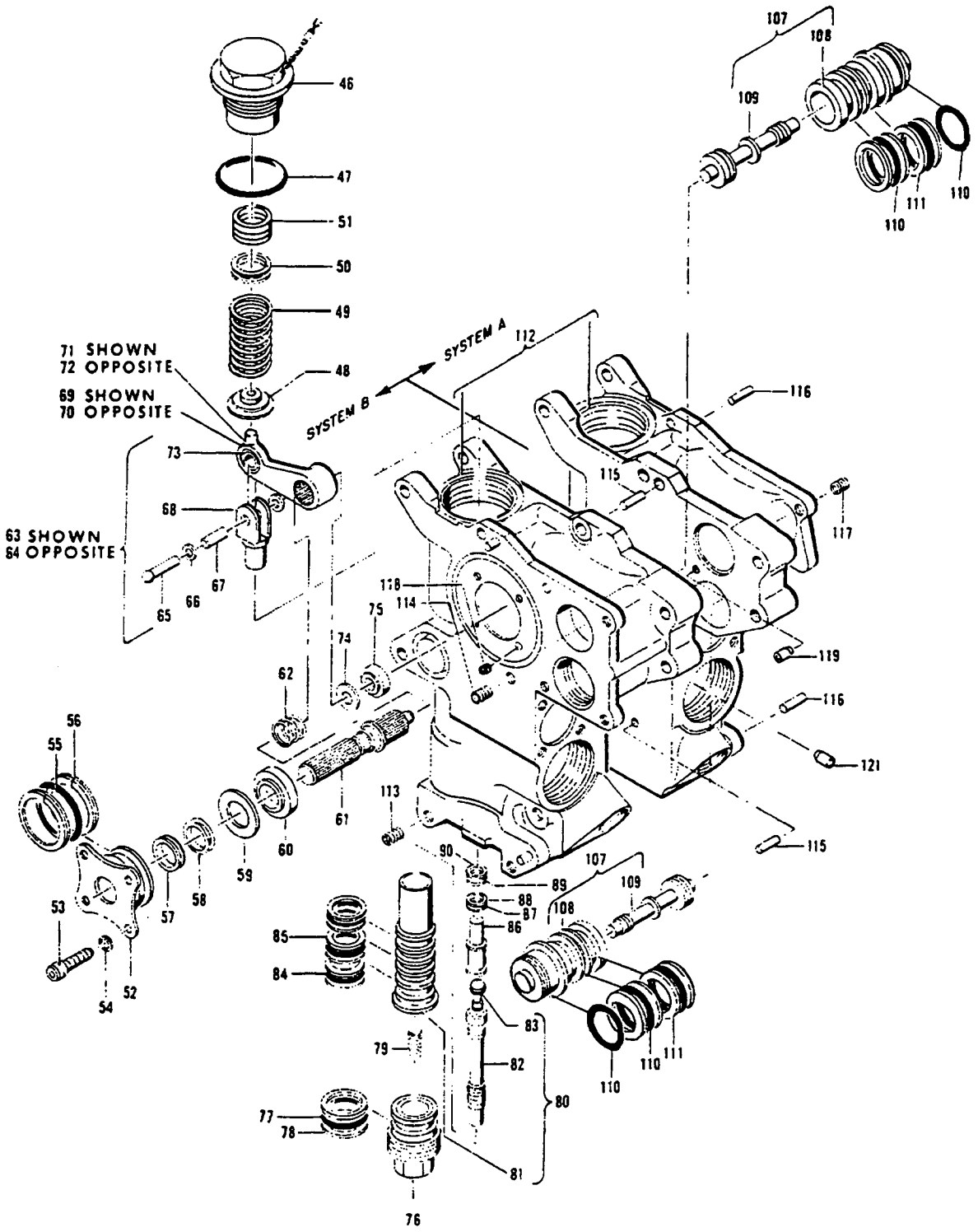
FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
96	69-39146-1		. PLUG		1
97	AN960PD816		. WASHER		1
98	66-24406-1		. SLEEVE, SHIPPING	ABC	1
98	65-51237-1		. ARM ASSY, STABILIZER INPUT	D-G	1
98A	MS16624-1037		. . RING, EXTERNAL RETAINING		1
98B	65-51237-4		. . BUSHING		1
98C	MS20426B3-6		. . RIVET		2
98D	F1915-4		. . NUT, ANCHOR, V15653		1
98E	65-51237-2		. . ARM		1
99	69-39145-1		. CLAMP, POT		1
100	NAS1351-4H24P		. SCREW		2
101	NAS620A416L		. WASHER		2
102	NAS1351-4H8P		. SCREW		2
103	600-8115-1-4		. WASHER, SEALING, V83259 *[2](PREF)		2
103	650-8115-1-4		. WASHER, SEALING, V83259 *[2](OPT)		2
103A	AN960-416		. WASHER *[2] (OPT)		2
103B	NAS1523AA-4P		. PACKING *[2] (OPT)		2
104	NAS1351-4H10P		. SCREW		10
105	NAS620A416L		. WASHER		10
106	65-51222-1		. HOUSING ASSY, LH		1
107	65-51222-2		. HOUSING ASSY, RH		1
108	MS21208C0610		. . INSERT		2
109	MS21208C0810		. . INSERT		8
110	MS21209F1-15		. . INSERT (USED ON 65-51222-1)		8
110	MS21209F1-15		. . INSERT (USED ON 65-51222-2)		6
111	NAS607-3-4		. . PIN		2
112	MS21209F4-20		. . INSERT (USED ON 65-51222-1 ONLY)		2
113	MS21208F1-10		. . INSERT		1
114	3591-4CN0250		. . INSERT, V26344		3
115	65-51222-7		. . PAD (USED ON 65-51222-1 ONLY)		1
115A	65-51222-3		. . HOUSING (USED ON 65-51222-1)		1
115B	65-51222-4		. . HOUSING (USED ON 65-51222-2)		1
116	69-39135-1		. SLEEVE, CAMSHAFT		1
117	NAS1611-214		. PACKING, O-RING		2
118	BACN12A3MR		. PLATE, IDENTIFICATION		1
119	69-35587-1		. STRAP		2
120	NAS1611-142		. PACKING, O-RING		2
121	NAS1611-020		. PACKING, O-RING		2
122	65-51245-3		. HYDRAULIC CONTROL ASSY (FIG. 1102)	A	1
122	65-51245-4		. HYDRAULIC CONTROL ASSY (FIG. 1102)	B-F	1
122	65-51245-5		. HYDRAULIC CONTROL ASSY (FIG. 1102)	G	1
123	65-51237-1		. DELETED		
124	69-51524-1		. PIN *[1]	DE	1

*[1] FOR SHIPPING AND STORAGE ONLY.

*[2] AN960-416 WITH NAS1523AA-4P OPTIONAL TO 650-8115-1-4. OPTIONAL TO 600-8115-1-4.

3. Exploded View





Hydraulic Control Assembly
Figure 1102 (Sheet 2)

H89745

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102-					
	65-51245-3		HYDRAULIC CONTROL ASSY	A	RF
	65-51245-4		HYDRAULIC CONTROL ASSY	B	RF
	65-51245-5		HYDRAULIC CONTROL ASSY	C	RF
1	69-39117-2		. RETAINER, FILTER (SB 27-1014)	A	2
1	69-39117-1		. RETAINER, FILTER	BC	2
2	NAS1612-16		. PACKING, O-RING		2
3	4245-501		. FILTER, V16989 (BOEING 10-60808-1)		2
3	21-11175		. FILTER, V81873 (BOEING 10-60808-1)		2
4	NAS1611-012		. PACKING, O-RING		2
5	MS28774-012		. RING, BACKUP		4
6	69-39144-1		. PLUG, SEAL		2
7	NAS1351-3H8P		. SCREW		4
8	NAS620A10		. WASHER		4
9	NAS1611-120		. PACKING, O-RING		4
10	MS28774-120		. RING, BACKUP		8
11	BACC14H4LD		. CAP (REPLS MS21914-4D)		1
12	MS21902-4		. UNION		1
13	NAS1612-4		. PACKING, O-RING		1
14	BACC14H6LD		. CAP (REPLS MS21914-6D)		2
15	MS21916D8-6		. REDUCER		2
16	NAS1612-8		. PACKING, O-RING		2
17	BACC14H4LD		. CAP (REPLS MS21914-4D)		3
18	MS21916-6-4		. REDUCER		3
19	NAS1612-6		. PACKING, O-RING		3
20	65-51248-1		. COVER, SWITCH		1
21	NAS1352-06H6P		. SCREW		3
22	NAS620A6L		. WASHER		3
23	16-430228		. SWITCH (S1), V04426		1
24	20097H92C80		. SCREW, V80539		2
24	AN500A2-8		. SCREW (OPT)		2
25	AN960PD2		. WASHER		2
26	66-24401-1		. NUTPLATE		1
27	025-0478-000		. CAP, DUST, V71468		1
28	65-51249-1		. COVER		1
29	NAS1352-06H6P		. SCREW		4
30	NAS520A6L		. WASHER		4
31	MS24265R10B5 P7X		. CONNECTOR	AB	1
31	ZZBAC1510-5P7 A34		. CONNECTOR	C	1
32	16-430228		. SWITCH (S2), V04426		1
33	20097H92C80		. SCREW, V80539		2
33	AN500A2-8		. SCREW (OPT)		2
34	AN960PD2		. WASHER		2
35	66-24401-1		. NUTPLATE		1
36	RNF100-1/8BLK		. TUBING, SHRINKABLE, V06090		AR
37	69-39137-1		. RETAINER, SLEEVE		2
38	69-39149-1		. SLEEVE AND PISTON ASSY		2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102-					
39	69-39149-2		. . LAPPED ASSY		1
40	65-67356-1		. . . PISTON		1
41	65-67354-1		. . . SLEEVE		1
42	NAS1611-008		. . PACKING, O-RING		1
43	S11338-009		. . STRIP, CAP, V97820		1
44	NAS1611-019		. PACKING, O-RING		4
45	MS28774-019		. RING, BACKUP		8
46	69-39114-1		. RETAINER, PRELOAD		2
47	NAS1612-16		. PACKING, O-RING		2
48	69-39113-1		. SEAT, SPRING		2
49	66-24409-1		. SPRING, VALVE PRELOAD		2
50	69-39106-3		. SHIM (FORCE)		6
51	69-39106-2		. SHIM		6
52	69-39103-1		. RETAINER, Q-SHAFT		2
53	NAS1351-3H8P		. SCREW		4
54	NAS620A10L		. WASHER		4
55	NAS1611-215		. PACKING, O-RING		2
56	MS28774-215		. RING, BACKUP		4
57	BACP11W111		. PACKING, O-RING		2
58	BACR12AT111		. RING, CAP		2
59	69-39124-1		. RETAINER, SEAL		2
60	HDH001-8		. BEARING, V40920		2
61	65-51228-1		. Q-SHAFT		2
62	66-24407-1		. SPRING, ARM, PRELOAD		2
63	69-39109-3		. ARM, CLEVIS ASSY		1
64	69-39109-4		. ARM, CLEVIS ASSY		1
65	MS20615-3M10		. . RIVET		1
66	69-39101-6		. . WASHER		2
67	69-39105-1		. . SPACER		1
68	69-50948-1		. . CLEVIS		1
69	69-39134-1		. . ARM ASSY (LH)		1
70	69-39134-2		. . ARM ASSY (RH)		1
71	69-39134-3		. . . ARM (LH)		1
72	69-39134-4		. . . ARM (RH)		1
73	69-39134-5		. . . BEARING (MAKE FROM BACB10A122)		2
74	69-39101-3		. WASHER		2
75	SFR4K13		. BEARING, V83086		2
76	69-39115-1		. RETAINER, VALVE		2
77	NAS1611-116		. PACKING, O-RING		2
78	MS28774-116		. RING, BACKUP		4
79	66-24408-1		. SPRING, VALVE BALANCE		2
80	69-50945-1		. VALVE ASSY		2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102-					
81	65-63668-1		. . SLEEVE		1
82	65-63669-1		. . SLIDER		1
83	69-50946-1		. . POPPET		1
84	NAS1611-015		. PACKING, O-RING		6
85	MS28774-015		. RING, BACKUP		12
86	69-50947-1		. PLUNGER		2
87	69-39106-1		. SHIM		4
88	69-39106-4		. SHIM		8
89	69-39106-5		. SHIM		AR
90	69-39106-6		. SHIM		AR
91	NAS1103-33		. BOLT (REPLS NAS464P3A33)		1
92	BACN10JC3		. NUT (REPLS NAS1022N3)		1
93	AN960PD10		. WASHER		2
94	HIPSIEWB22-3 -20		. BOLT, V56878		3
95	FN26-1032		. NUT, V56878		3
96	WP22-3		. WASHER, V56878		3
97	WC22-3		. WASHER, V56878		3
98	BACB30NE3-3		. BOLT (REPLS NAS1303-3)		1
99	AN960PD10L		. WASHER		1
100	HIPSIEWB22-3 -10		. BOLT, V56878		1
101	FN26-1032		. NUT, V56878		1
102	WP22-3		. WASHER, V56878		1
103	WC22-3		. WASHER, V56878		1
104	BACB30NE3-8		. BOLT (REPLS NAS1303-8)		3
105	BACN10JC3		. NUT (REPLS NAS1022N3)		3
106	AN960PD10		. WASHER		6
107	69-39147-1		. SLEEVE AND PISTON ASSY, INNER		2
108	65-67355-1		. . SLEEVE		1
109	65-67357-1		. . PISTON		1
110	NAS1611-019		. PACKING, O-RING		6
111	MS28774-019		. RING, BACKUP		8
112	65-51246-1		. HOUSING ASSY		1
113	3591-3CN0190		. . INSERT, SCREW LOCK, V26344		1
114	3591-4CN0250		. . INSERT, SCREW LOCK, V26344		6
115	D9-437		. . PIN, DOWEL, V00141		2
116	D9-625		. . PIN, DOWEL, V00141		4
117	MS21208C0610		. . INSERT, SCREW THD		7
118	MS21209F1-15		. . INSERT, SCREW LOCK		16
119	125001		. . LEE, PLUG, V92555		2
120	156001		. . LEE, PLUG, V92555		4
121	125002-022		. . LEE, JET, V92555		2
122	US1		. SEAL, V87733		AR

VENDORS

V00141 PIC DESIGN CORP. OF WELLS BENRUS CORP., P.O. BOX 335 BENRUS CENTER, RIDGEFIELD, CONNECTICUT 06877

V04426 ILLINOIS TOOL WORKS INC., LICON DIV., 6615 WEST IRVING PARK ROAD, CHICAGO, ILLINOIS 60634

V06090 RAYCHEM CORP., 300 CONSTITUTION DRIVE, MENLO PARK, CALIFORNIA 94025

V09455 LEAR SEIGLER INC., TRANSPORT DYNAMICS DIV., P.O. BOX 1953, 3131 WEST SEGERSTROM STREET, SANTA ANA, CALIFORNIA 92702

V15653 KAYNAR MFG. CO. INC., KAYLOCK DIV., P.O. BOX 3001, 800 SOUTH STATE COLLEGE BLVD., FULLERTON, CALIFORNIA 92634

V15860 NEW HAMPSHIRE BALL BEARINGS, INC., ASTRO DIV., 155 LEXINGTON AVENUE, LACONIA, NEW HAMPSHIRE 03246

V21335 TEXTRON INC., FAFNIR BEARING DIV., 37 BOOTH STREET, NEW BRITAIN, CONNECTICUT 06050

V21550 BRUNSWICK CORP., WINTEC-TECHNECTICS DIV., 2313 SOUTH SUSAN STREET, SANTA ANA, CALIFORNIA 92704

V26344 MITE CORP., 466 BLAKE STREET, NEW HAVEN, CONNECTICUT 06515

V40920 MINIATURE BEARING DIV., MPB CORP., OPTICAL AVENUE, PRECISION PARK, KEENE, NEW HAMPSHIRE 03431

V50294 NMB INC., 9730 INDEPENDENCE AVENUE, CHATSWORTH, CALIFORNIA 91311

V56878 SPS TECHNOLOGIES INC., HIGHLAND AVENUE, JENKINTOWN, PENNSYLVANIA 19046

V71468 ITT CANNON ELECTRIC, DIV. OF INTERNATIONAL TELEPHONE CORP., 10550 TALBERT AVENUE, P.O. BOX 8040, FOUNTAIN VALLEY, CALIFORNIA 92708

V73134 HEIM DIV., INCOM INTERNATIONAL INC., 60 ROUND HILL ROAD, FAIRFIELD CONNECTICUT 06430

V77896 REXNORD INC., BEARING DIV., 2400 CURTIS STREET, DOWNERS GROVE, ILLINOIS 60515

V80539 SPS TECNOLOGIES INC., AEROSPACE PRODUCTS DIV., 2701 SOUTH HARBOR BLVD., SANTA ANA, CALIFORNIA 92702

VENDORS

V81376	SOUTHWEST PRODUCTS CO., 2240 BUENA VISTA, IRVINDALE, CALIFORNIA 91706
V81873	TEXTRON INC., HYDRAULIC RESEARCH DIV., 25200 WEST RYE CANYON ROAD, VALENCIA, CALIFORNIA 91355
V83086	NEW HAMPSHIRE BALL BEARINGS INC., ROUTE 202 PETERBOROUGH, NEW HAMPSHIRE, 03458
V83259	PARKER-HANNIFIN CORP., O-SEAL DIV., 10567 JEFFERSON BLVD., CULVER CITY, CALIFORNIA 90231
V87733	THE UNITED SEAL CO., 2000 FAIRWOOD AVENUE, COLUMBUS, OHIO, 43207
V92555	LEE COMPANY, 2 PETTIPAUG ROAD, WEST BROOK, CONNECTICUT 06498
V97613	SARGENT INDUSTRIES, KAHR BEARING DIV., 3010 NORTH SAN FERNANDO ROAD, BURBANK, CALIFORNIA 91503
V97820	SHAMBAN W.S. AND CO., 711 MITCHELL ROAD, NEWBURY PARK, CALIFORNIA 91320
V97871	E-SYSTEMS INC., GARLAND DIV., P.O. BOX 6118, DALLAS, TEXAS 75222

Part No.	Fig. and Index No.	Qty per Assy
AJ045101	1101-18	1
AN500A2-8		AR
AN960PD10		AR
AN960PD10L		AR
AN960PD2		AR
AN960PD8		AR
AN960PD816		AR
AN960PD916L		AR
AN960-416	1101-103A	2
BACB10A329	1101-52	2
BACB10A329	1101-60	2
BACB30NE3-3	1102-98	1
BACB30NE3-8	1102-104	3
BACC14H4LD	1102-11	1
BACC14H4LD	1102-17	3
BACC14H6LD	1102-14	2
BACN10JC3	1101-22	2
BACN10JC3	1102-92	1
BACN10JC3	1102-105	3
BACN12A3MR	1102-118	1
BACP11W111	1102-57	2
BACP11W116	1101-94	1
BACP11W214	1101-90	1
BACR12AT111	1102-58	2
BACR12AT116	1101-95	1
BACR12AT214	1101-91	1
BJC8TA12-7A	1101-1B	
CVC1152-3	1101-47	4
CVC1152-3	1101-69	2
CVC754-232S13	1101-39	2
DBS4-103	1101-18	1
D9-437	1102-115	2
D9-625	1102-116	4
FN26-1032	1102-95	4
FN26-1032	1102-101	1
FR4PPK13/MIL-G-23827	1101-56	4
FR4ZZRA7P13 LG54	1101-56	4
F1915-4	1101-98D	1
HDH001-8	1102-60	2
HIPSIEWB22-3-10	1102-100	1
HIPSIEWB22-3-20	1102-94	3
KJN4-13	1101-18	
MB539DDE6531	1101-92	1
MB540DDE6531	1101-88	1
MS16624-1037		AR
MS20426B3-6		AR
MS20427M3-12		AR
MS20470D2-10		AR
MS20615-3M12		AR
MS20615-3M10		AR
MS21208C0610		AR
MS21208C0810		AR
MS21208F1-10		AR
MS21209C0815		AR
MS21209F1-15		AR
MS21209F4-15		AR
MS21209F4-20		AR
MS21209D6		AR
MS21209-4		AR
MS21914-4D		AR
MS21914-6D		AR
MS21916-6-4		AR
MS21916D8-6		AR
MS24265R10B5P7X		AR
MS24665-132		AR
MS28774-012		AR
MS28774-015		AR
MS28774-019		AR
MS28774-116		AR
MS28774-120		AR
MS28774-215		AR
NAS1022N3		AR
NAS1103-33		AR
NAS1303-3		AR
NAS1303-8		AR
NAS1351-3H8P		AR
NAS1351-3LN6		AR
NAS1351-4H10P		AR
NAS1351-4H16P		AR
NAS1351-4H24P		AR
NAS1351-4H8P		AR
NAS1352-06H4P		AR
NAS1352-06H6P		AR
NAS1352-08H6P		AR
NAS1352-08H8P		AR
NAS1523AA-4P	1101-103B	1
NAS1611-007		AR

Part No.	Fig. and Index No.	Qty. per Assy.
NAS1611-008		AR
NAS1611-012		AR
NAS1611-015		AR
NAS1611-019		AR
NAS1611-020		AR
NAS1611-110		AR
NAS1611-112		AR
NAS1611-116		AR
NAS1611-120		AR
NAS1611-142		AR
NAS1611-214		AR
NAS1611-215		AR
NAS1612-16		AR
NAS1612-4		AR
NAS1612-6		AR
NAS1612-8		AR
NAS464P3A33		AR
NAS538-4P22		AR
NAS607-3-4		AR
NAS620A10		AR
NAS620A10L		AR
NAS620A416L		AR
NAS620A6		AR
NAS620A6L		AR
NAS620A8L		AR
NAS679A3		AR
NH04-210S	1101-18	1
PBR04C07BAC	1101-18	1
RNF100-1/8BLK	1102-36	AR
SFR4K13	1102-75	2
SR3PPK13/MIL-G-3278	1101-34	4
S11338-009	1102-43	2
US1	1102-122	AR
WC22-3	1102-97	4
WC22-3	1102-103	1
WP22-3	1102-96	4
WP22-3	1102-102	1

Part No.	Fig. and Index No.	Qty. per Assy.
YTS200	1101-18	1
ZZBAC1510-5P7A34	1102-31	1
025-0478-000	1102-27	1
10-60516-104	1101-18	2
10-60808-1	1102-3	2
125001	1102-119	2
125002-022	1102-121	2
156001	1102-120	4
16-430228	1102-23	2
16-430228	1102-32	1
20097H92C80	1102-24	2
20097H92C80	1102-33	2
21-11175	1102-3	2
3591-3CN0190	1102-113	1
3591-4CN0250	1101-114	3
3591-4CN0250	1102-114	6
600-8115-1-4	1101-103	2
650-8115-1-4	1101-103	2
65-45132-5	1101	RF
65-45132-7	1101	RF
65-45132-8	1101	RF
65-45132-9	1101	RF
65-45132-10	1101	RF
65-45132-11	1101	RF
65-45132-12	1101	RF
65-51220-1	1101-9	2
65-51221-1	1101-30	2
65-51221-2	1101-31	2
65-51222-1	1101-106	1
65-51222-2	1101-107	1
65-51222-3	1101-115A	1
65-51222-4	1101-115B	1
65-51222-7	1101-115	1
65-51224-1	1101-1	1
65-51224-2	1101-2	1
65-51227-1	1101-37	2
65-51228-1	1102-61	2

Part No.	Fig. and Index No.	Qty. per Assy.
65-51230-1	1101-49	2
65-51230-2	1101-50	2
65-51231-1	1101-57	2
65-51231-2	1101-58	2
65-51232-5	1101-81	1
65-51232-6	1101-82	1
65-51232-7	1101-87	1
65-51232-8	1101-86	1
65-51232-10	1101-81	1
65-51232-11	1101-87	1
65-51232-12	1101-86	1
65-51233-1	1101-85	1
65-51235-1	1101-13	2
65-51237-1	1101-98	1
65-51237-2	1101-98E	1
65-51237-4	1101-98B	1
65-51237-1	1101-123	1
65-51239-1	1101-27	2
65-51243-1	1101-42	1
65-51243-2	1101-43	1
65-51245-3	1101-122	1
65-51245-3	1102	
65-51245-4	1101-122	1
65-51245-4	1102	
65-51245-5	1101-122	1
65-51245-5	1102	RF
65-51246-1	1102-112	1
65-51248-1	1102-20	1
65-51249-1	1102-28	1
65-63668-1	1102-81	2
65-63669-1	1102-82	2
65-67335-1	1102-108	2
65-67354-1	1102-41	2
65-67356-1	1102-40	2
65-67357-1	1102-109	2
650-8115-1/4	1101-105	2
66-24400-1	1101-14	2
66-24401-1	1102-26	2
66-24401-1	1102-35	1
66-24401-1	1101-33	2
66-24402-2	1101-63	2
66-24404-1	1101-78	2
66-24405-1	1101-41	2
66-24406-1	1101-98	1
66-24407-1	1102-62	2
66-24408-1	1102-79	2
66-24409-1	1102-49	2
69-35587-1	1101-119	2
69-35948-1	1101-72	2
69-39100-1	1101-16	2
69-39100-2	1101-17	2
69-39101-1	1101-21	8
69-39101-3	1102-74	2
69-39101-4	1101-54	2
69-39101-5	1101-53	2
69-39101-6	1101-61	8
69-39101-6	1102-66	2
69-39102-1	1101-28	2
69-39103-1	1102-52	2
69-39105-1	1102-67	2
69-39105-2	1101-55	2
69-30105-3	1101-62	2
69-39106-1	1102-87	4
69-39106-2	1102-51	6
69-39106-3	1102-50	6
69-39106-4	1102-88	8
69-39106-6	1102-89	AR
69-39106-6	1102-90	AR
69-39109-3	1102-63	1
69-39109-4	1102-64	1
69-39112-1	1101-20	2
69-39113-1	1102-48	2
69-39114-1	1102-46	2
69-39115-1	1102-76	2
69-39117-1	1102-1	2
69-39117-2	1102-1	2
69-39118-1	1101-71	2
69-39118-2	1101-46	2
69-39119-1	1101-65	2
69-39120-1	1101-68	2
69-39121-1	1101-83	1
69-39122-1	1101-80	1
69-39123-1	1101-79	1
69-39124-1	1102-59	2
69-39124-2	1101-93	1
69-39124-3	1101-89	1
69-39130-1	1101-23	2
69-39131-1	1101-26	2

Part No.	Fig. and Index No.	Qty per Assy
69-39132-1	1101-12	2
69-39133-1	1101-6	2
69-39134-1	1102-69	1
69-39134-2	1102-70	1
69-39134-3	1102-71	1
69-39134-4	1102-72	1
69-39134-5	1102-73	2
69-39135-1	1101-116	1
69-39136-1	1101-40	2
69-39137-1	1102-37	2
69-39139-1	1101-74	2
69-39144-1	1102-6	2
69-39145-1	1101-99	1
69-39146-1	1101-96	1
69-39147-1	1102-107	2
69-39149-1	1102-38	2
69-39149-2	1102-39	2
69-50945-1	1102-80	2
69-50946-1	1102-83	2
69-50947-1	1102-86	2
69-50948-1	1102-68	2
69-51524-1	1101-124	1
69-54684-1	1101-72	2
90291	1101-18	1

Part No.	Fig. and Index No.	Qty per Assy