TO: ALL HOLDERS OF FLIGHT SPOILER POWER CONTROL UNIT ASSEMBLY OVERHAUL MANUAL, 27-60-41

REVISION NO. 53, DATED NOV 1/08

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
Edited Dynamic Leak Check procedure								X					
Added 251A1240-4 to IPL Figure 1103												X	

FLIGHT SPOILER POWER CONTROL UNIT ASSEMBLY
27-60-41

BOEING P/N 65-44561-5 thru -15
65-49580-11 thru -21

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30269	Feb 15/69
		PRR 30602	Feb 15/69
		PRR 30678	Feb 15/69
		PRR 31435	Nov 10/69
		PRR 31442	Nov 10/69
27-1020, Rev 1		PRR 31580	Mar 10/72
		PRR 31941	Mar 10/72
		PRR 32054	Mar 10/72
		PRR 32121-10	Mar 10/72
		PRR 33122	Jan 5/82
27-1112, Rev 1			Dec 5/83
		PRR 33752	Mar 5/85

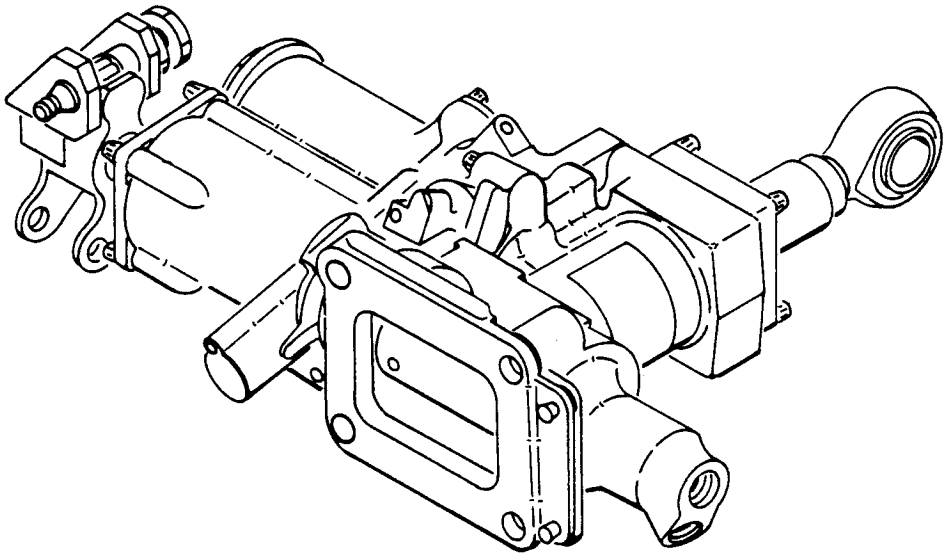
LIST OF EFFECTIVE PAGES

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

	PAGE	DATE		PAGE	DATE		PAGE	DATE
	27-60-41			705	Dec 1/97		1108	Jul 1/04
	T-1	Sep 5/85		706	Nov 1/05		1109	Jul 1/04
	T-2	BLANK		707	Dec 1/97		1110	Jul 1/04
*	LEP-1	Nov 1/08		708	Dec 5/90		1111	Nov 1/04
	LEP-2	BLANK		709	Nov 1/98		1112	Jul 5/80
	T/C-1	Jul 5/80		710	Dec 1/97	*	1113	Nov 1/08
	T/C-2	BLANK		711	Jul 1/04		1114	Jul 1/03
	1	Sep 5/86		712	Dec 1/97		1115	Jul 1/03
	2	Dec 5/91		713	Nov 1/07		1116	Mar 1/08
	3	Dec 5/91		714	Nov 1/07	*	1117	Nov 1/08
	4	BLANK		714A	Dec 1/97		1118	Mar 1/08
	101	Sep 1/94		714B	Dec 5/90			
	102	Sep 5/85		715	Nov 1/98			
	103	Mar 1/96		716	Dec 5/93			
	104	BLANK		717	Dec 5/93			
	201	Jul 5/80		718	Jul 1/04			
	202	BLANK		719	Jul 1/04			
	301	Jul 1/04		720	Dec 5/93			
	302	Jul 1/99		721	Sep 5/86			
	401	Nov 1/03		722	Jul 1/04			
	402	Nov 1/07		723	Dec 5/93			
	402A	Nov 1/07		724	Dec 5/93			
	402B	BLANK		725	Dec 5/93			
	403	Nov 1/03		726	Dec 5/93			
	404	Nov 1/03		727	Jul 1/04			
	405	Nov 1/03		728	Dec 5/93			
	406	Nov 1/04	*	729	Nov 1/08			
	501	Mar 10/72		730	Dec 5/93			
	502	Nov 1/04		801	Dec 5/90			
	502A	Nov 1/04		802	Dec 25/72			
	502B	BLANK		803	Dec 25/72			
	503	Mar 1/99		804	Dec 5/91			
	504	Nov 1/07		901	Dec 5/90			
	505	Jul 1/04		902	BLANK			
	506	Mar 5/85		1001	Dec 1/97			
	507	Mar 5/85		1002	BLANK			
	508	Sep 5/85		1101	Dec 1/97			
	601	Dec 5/90		1102	Mar 10/72			
	602	Dec 5/90		1103	Jun 1/97			
	603	Mar 1/97		1104	Jul 1/04			
	604	Dec 5/90		1104A	Jul 1/04			
	701	Dec 1/97		1104B	BLANK			
	702	Mar 1/08		1105	Mar 1/08			
	703	Sep 5/87		1106	Jul 1/04			
	704	Nov 1/07		1107	Jul 1/04			

TABLE OF CONTENTS

FLIGHT SPOILER POWER CONTROL UNIT ASSEMBLY



Flight Spoiler Power Control Unit Assembly
Figure 1

DESCRIPTION AND OPERATION

1. Description

   A. A spoiler power control unit is used to position each of the flight spoilers. Each of the identical units includes a cylinder, piston and rod assembly, control valve, filter, thermostat valve, relief check valve, blow down check valve, extension check and thermal relief valve, snubber check valve, and overtravel pistons. Each power control unit is trunnion mounted on a support fitting on the wing rear spar. An actuator link provides control inputs to the unit from a spoiler control quadrant which is also mounted on the support fitting. Hydraulic power is directed to the power control unit through trunnion fittings. The units are attached at the piston rod end to the spoiler.

B. The input arm on the unit is adjustable to provide proper spoiler pickup. The input arm has a mounting location for the actuator link. The unit is used for spoilers Nos. 2, 3, 6 and 7.

2. Operation

A. The spoiler control system actuates the six flight spoilers to supplement ailerons in providing lateral control. The spoilers lie flush with the wing when not in use. They can be raised to various angles by the flight spoiler power control unit assemblies which are attached between the spoiler panels and wing structure at the spanwise center of each spoiler panel.

B. Rotation of the spoiler control quadrant displaces the power control unit input lever and the control valve, allowing hydraulic fluid at 3000 psi to be ported to one side of the piston and rod assembly. The input lever remains stationary after the initial displacement, but the power control unit rotates as it positions the spoiler. Rotation of the unit returns the control valve to the neutral position, stopping hydraulic fluid flow at the desired spoiler position.

C. When the power control unit is pressurized, the extension check valve is held open by pressure acting on a piston at the base of the valve. If hydraulic pressure is lost, springs reseat the extension check valve, to prevent spoiler float. A blow-down check valve located in the pressure line allows the spoilers to blow down at critical speed. Protection against power control unit damage due to thermal expansion of entrapped hydraulic fluid or extreme up loads from the flaps is provided by a thermal relief valve and relief check valve. The thermal relief valve is the same valve as the extension check valve; however, it is opened by actuator down pressure operating an additional piston. The thermal relief valve is set to open when a pressure of 4000 psi maximum is reached with hydraulic power off, and to reseat at a pressure no lower than 2800 psi. The relief check valve will also protect against damage from extreme flap up loads when hydraulic power is on.

D. To prevent hydraulic lock when the spoilers are in the full down position, a snubber check valve is built into the piston. With the spoilers retracted and the piston in the full down position, an up signal to the control valve allows hydraulic fluid to flow to the base of the cylinder, around the annulus in the piston, and through the snubber check valve to the face of the piston.

3. Leading Particulars

Operating Fluid -- BMS 3-11 Hydraulic Fluid
Operating Pressure -- 3000 psi
Proof Pressure -- 5400 psi
Length (between center of bearing and centerline of input shaft) --
Extended -- 8.849 to 8.889 inch
Retracted -- 6.375 to 6.875 inches
Actuator Travel -- 36.5 degrees
Stroke -- 2.224 to 2.264 inches
Weight -- Approximately 10 pounds

DISASSEMBLY

1. General

   A. Remove all lockwire from assembly.

   B. If any shipping caps or plugs are present, remove these first. Empty unit of hydraulic fluid. Actuate input linkage while draining unit, to ensure all passages are emptied.

      CAUTION: DO NOT PLACE UNIT IN ANY CLAMPING DEVICE EXCEPT LOCKWIRE FIXTURE, TX150817 OR EQUIVALENT, OR DAMAGE MAY RESULT. USE CARE IN HANDLING LAPPED COMPONENTS TO AVOID MARRING SURFACES.

   C. If necessary remove hydraulic fittings per Fig. 1103.

   D. Note the number and thickness of shims (6, 70, Fig. 1101) to facilitate reassembly.

   E. Do not remove the pins and plugs which seal drilled passages, unless they are leakage or obviously defective.

2. Disassemble spoiler power control unit as shown on Fig. 1101.

   A. Remove mounting bracket assembly (1) from assembly.

      (1) Pull cotter pins (2), and remove nuts (3), washers (4) and tapered pins (5). Do not remove bonded shim (6), unless replacement is necessary.

      (2) Slide journal (8) from barrel (49). Remove seals (10) from journal. Do not remove bushings (9) from bracket (7) or journal (8) unless replacement is necessary.

         NOTE: Bracket (7) and journal (8) are a matched set and must not be separated. Tag and store each set in a separate sealed bag.

   B. Disassemble barrel assembly (46) and related parts from manifold assembly (107).

      (1) Remove screws (11, 13, 15, and 17) and washers (12, 14, 16 and 18).

      (2) Use care in separating barrel assembly (46) from manifold assembly (107) to avoid dropping four transfer tubes (21 and 24). Strip retainers (19, 22, 25) and packings (20, 23 and 26) from transfer tubes.

C. Disassemble related parts from barrel assembly.

(1) Remove key (42) and loosen jamnut (43). Run nut up shank of rod end (44).

(2) Remove bolts (27) and washers (28). Pull retainer (29) and end bearing (33) from barrel (49). Remove scraper (30), seal assembly (30A) or foot seal (31), packing (32), retainers (34) and packing (35).

(3) Pull rod end (44) and piston (45) from barrel. Strip cap ring (35A), or cap (36) and packing (37) from piston.

(4) Depress spring (41) to relieve tension on snubber seat (38). Use hex wrench to unscrew seat from piston (45). Remove seat, washer (39 or 39A) and spring (41). Slip poppet (40) from seat.

(5) Unscrew rod end (44) from piston (45) and remove jam nut (43).

D. Disassemble input assembly (54) from manifold assembly (107).

(1) Remove screws and washers (50 and 51). Make sure that internal components of input assembly are free from binding, and pull assembly from manifold. See Fig. 1102 and paragraph 3 for disassembly of input assembly.

(2) Slide retainers (52) and packing (53) from assembly (54).

E. Remove components associated with the manifold assembly.

(1) Unscrew cap (55). Remove packing (56), plug (57) or thermostat valve (57), retainers (58) and packing (59).

NOTE: Applicable to assemblies 65-44561-5, -6, -7 and -9.

(2) Unscrew cap (60). Remove packing (61), spring (62), poppet assembly (63), and sleeve (66). Strip off retainers (67) and packing (68). Pull out plunger (69), spring (71) and shim (70).

NOTE: Record thickness of shim (70) to aid reassembly procedures.

(3) Extract piston (72) and remove rings (73).

NOTE: Pull piston with rod having a 6-32UNF-3B thread on one end.

(4) Extract piston (74) and remove retainers (75) and packing (76).

NOTE: Pull piston with rod having a 1-64UNC-3B thread on one end.

(5) Remove screws (77), washers (78) and cap (79). Strip retainers (80) and packings (81) from cap.

(6) Unscrew control valve cap (97). Remove packing (98) and spring washer (99) or special retainer (99). Pull slide and sleeve assembly (100) from manifold assembly (107). Remove spring (103). Slide (101) and sleeve (102) are matched parts. Tag and store each set in separate sealed bag. Do not remove locking ring (102A) or collar (102B) unless replacement is necessary.

CAUTION: HANDLE MATCHED FIT ASSEMBLIES WITH GREAT CARE. DROPPING, SCRAPING, OR ALLOWING THEM TO CONTACT OTHER PARTS CAN DESTROY CRITICALLY LAPPED SURFACES.

(7) Remove retainers (104) and packings (105) from sleeve (102).

(8) Reach inside manifold and press step piston (83) out of manifold. Remove piston ring (82).

(9) Attach blowout tool, 9652 or equivalent to recess in manifold for the removal of piston (85). Slowly apply hydraulic pressure to unseat and pull piston (85) from recess. Remove piston (85) from manifold and remove ring (84).

(10) Unscrew caps (86). Discard packings (87). Remove check valves (88), retainers (89) and packings (90).

(11) Remove cap (91) with retainers (92) and packings (93). Extract filter (94) with retainers (95) and packing (96).

(12) Do not remove nameplate (106) unless replacement is necessary.

(13) Do not remove inserts (108), pins (109, 111, 113, 115 and 117) or plugs (110, 112, 114, 116 and 118) unless parts are defective.

3. Disassemble input assembly as shown on Fig. 1102:

A. Press out pin (1) if installed. Remove collar (2) and back out screw (3) after loosening nut (4). Remove collar and bolt (5 , 6), bushings (7) and spacer (8). Refer to par. 3.K. of REPLACEMENT for drilling of pin holes in collar and pin to facilitate reassembly.

B. Slide fork (9), lever (10) and washer (11) from input shaft assembly (12). Pull shaft assembly (12) from cover (25). Remove bearings (20), spring (21), spacer (22), cap ring (23) and packing (24).

C. Punch out rivet (13) and pull pin (14). File or grind off upset on end of roller pin (15). Remove pin (15) , spacer (16), roller (17) and lever (18) from shaft (19).

CLEANING

1. Clean all parts except bearing (44) in accordance with standard industry practices and the information contained in 20-30-03. Clean bearing (44) only by special method for teflon lined bearing in 20-30-01.

INSPECTION/CHECK

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

2. Penetrant check per SOPM 20-20-02 -- bracket (7), journal (8), tubes (21, 24), bearing (33), caps (55, 79, 86, 91 97), plug (57), aluminum cap (60) (69-35541-1,-2 only), manifold (119) (Fig 1101).

3. Magnetic particle check per SOPM 20-20-01 -- poppets (40 and 63), springs (41, 62, 71 and 103), key (42), pistons (45, 72, 74, 83 and 85), barrel (49), steel cap (60) (69-35541-3 only), sleeve (66) and plunger (69) (Fig. 1101); and screw (3), pin (14), lever (18), spring (21) (Fig. 1102).

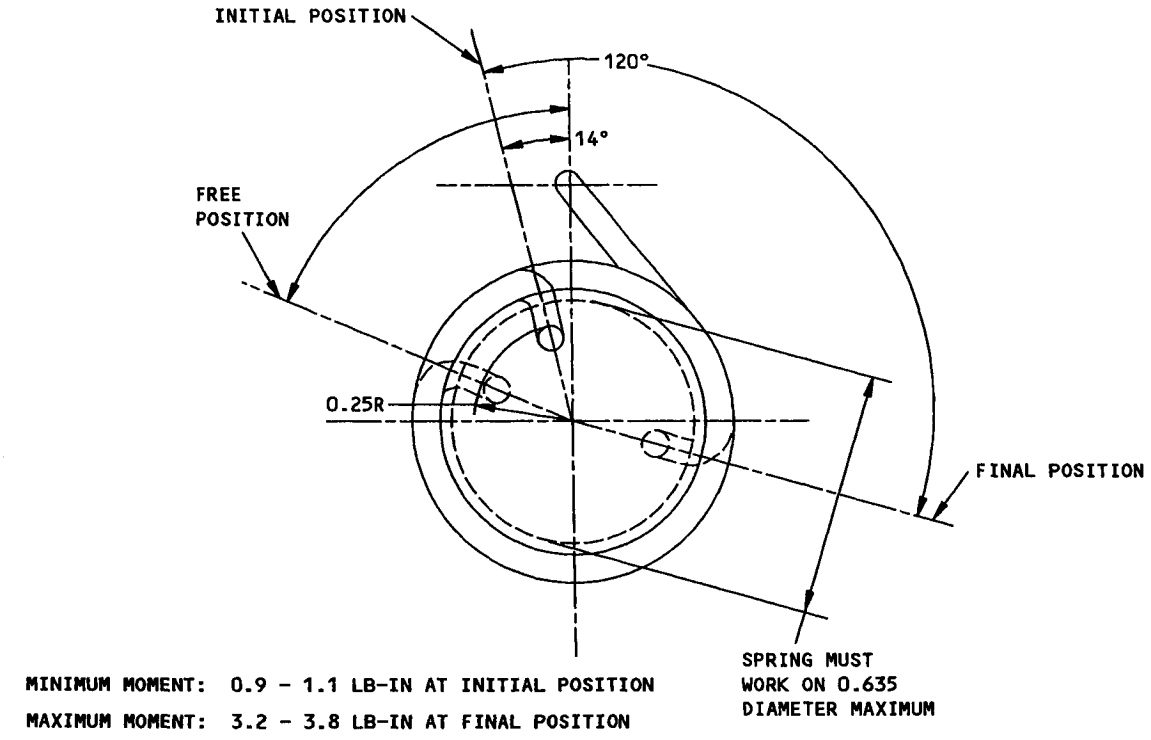
4. Springs

   A. Measure springs (41, 62, 71 and 103, Fig. 1101) in accordance with Fig. 301. No permanent set shall result from test load.

Index No. Fig. 1101	Approximate Free Length (inches)	Test Length (inches)	Load Limits (pounds)
41	0.68	0.53	0.13-0.17
62	0.86	0.640-0.660	0.18-0.24
71	0.92	0.693-0.713	58.5-63.5
103	1.28	0.426	0.72-0.88

Spring Check Data
Figure 301

B. Check strength of torsion spring (21, Fig. 1102) as shown on Fig. 302.



Check of Torsion Spring (21, Fig. 1102)
Figure 302

REPAIR

1. Repair (Fig. 1101 and 1102)

   A. Remove small defects by standard industry practices.

   B. Refer to Fits and Clearances for design dimensions and wear limits.

2. Refinish (Fig. 1101 and 1102)

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

   A. Fig. 1101 parts

      (1) Bracket (7), cap (97), manifold (119) -- Chromic acid anodize (F-2.26). Material: Al alloy.

      (2) Journal (8) -- Hard anodize (F-17.06) or flash hard anodize (F-17.30) on exterior surfaces. On lower surface mating with bracket (7), chemical treat (F-17.10, which is equivalent to SRF-2.114 without the primer). Material: Al alloy.

      (3) Washers (12, 14, 18) -- Cadmium plate (F-1.32). Material: 4340 steel, 125-150 ksi.

      (4) Transfer tubes (21, 24), retainer (29), caps (55, 79, 91), plug (57) -- Chromic acid anodize (F-17.02). Material: Al alloy.

      (5) Caps (86)

         (a) 66-22774-1 -- Chromic acid anodize (F-17.02). Material: Al alloy.

         (b) 66-22774-2 -- Passivate (F-17.25, which replaces F-17.09). Cadmium plate (F-15.02) external surfaces but not threads, thread relief, or adjacent end face. Material: 15-5PH CRES, 150-170 ksi.

      (6) End bearing (33), poppet (40), piston (45), barrel (49) -- Fig. 401.

      (7) Cap (60)

         (a) 69-35541-1, -2 -- Chromic acid anodize (F-17.02). Material: Al alloy.

         (b) 69-35541-3 -- Passivate (F-17.25, which replaces F-17.09). Cadmium plate (F-15.02) external surfaces. Material: 15-5PH CRES, 150-170 ksi.

   B. Fig. 1102 parts

      (1) Bushing (7) -- Cadmium plate (F-1.32). Material: 17-4PH CRES, 180-200 ksi.

      (2) Spacer (8) -- Chromic acid anodize (F-17.02). Material: Al alloy.

      (3) Fork (9) -- Cadmium plate (F-1.32), but not on splines. Material: 17-4PH CRES, 150-170 ksi.

      (4) Pin (14) -- Fig 401.

(5) Pin (15) -- Passivate (F-17.25, which replaces F-17.09). Material: 17-4PH CRES, 150-170 ksi.

(6) Spacers (16, 22), roller (17) -- Passivate (F-17.25, which replaces F-17.09). Material: 440C CRES, Rc 58-62.

(7) Lever (18) -- No finish. Material: Nitrided steel.

(8) Shaft (19) -- Passivate (F-17.25, which replaces F-17.09). Material: 17-4PH CRES, 180-200 ksi.

(9) Spring (21) -- No finish. Material: Music wire, ASTM A228/A228M.

(10) Cover (25) -- Fig. 401A.

3. Replacement

A. Replace unserviceable and irreparable parts.

B. Replace cotter pins, packings, lockwire and spring washer (99, Fig. 1101).

C. Collar (102B) (Fig. 402, 1101).

(1) Remove the old locking ring (102A) and collar (102B).

(2) Install a replacement collar (102B) and locking ring (102A) and swage to the dimension shown in Fig. 402.

D. Collar (2, BACC30M8, Fig. 1102)

(1) If collar was removed during disassembly, install a new collar and tighten it until screw (3, 69-35973-1) operates in a torque range of 15-35 lb-in.

(2) Break the shear section off the collar and drill a hole through the collar and screw as shown in Fig. 403. A maximum of three holes can be drilled through the screw before it must be replaced.

(3) Install roll pin (1) and make sure that screw (3, 69-35973-1) turns with a maximum torque of 35 lb-in.

E. Bushing (9, Fig. 1101)

(1) Machine the old bushing to a very thin wall thickness and remove.

(2) Penetrant examine bracket (7) or journal (8) (SOPM 20-20-02).

(3) Make sure the bracket (7) or journal (8) internal diameter is 1.4385-1.4390 inches.

(4) Refinish bracket (7) or journal (8), as specified in par. 2 above.

(5) Press fit a replacement bushing (9) in position with wet BMS 5-95 sealant (SOPM 20-50-03).

F. Nameplate (106, Fig. 1101)

(1) Clean the mating surface of the barrel (49, Fig. 1101) for application of the nameplate (106, Fig. 1101).

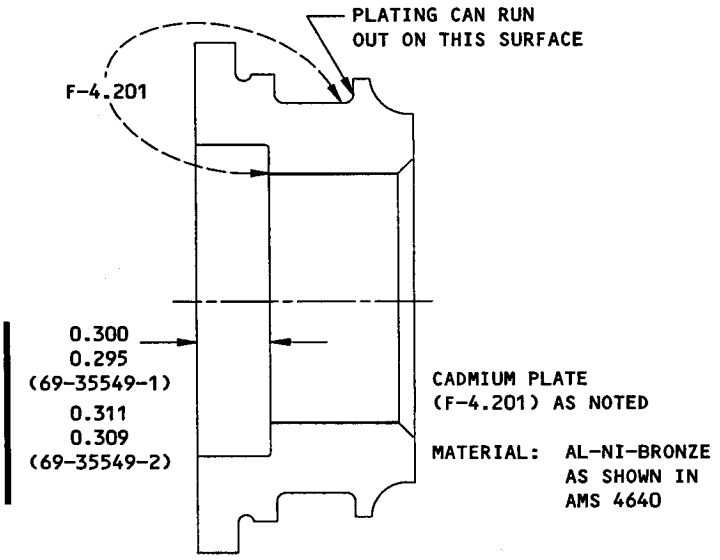
(2) Bend the nameplate (106, Fig. 1101) to match the contour of the barrel (49, Fig. 1101).

(3) Apply a thin coat of BMS 5-95 sealant for corrosion protection.

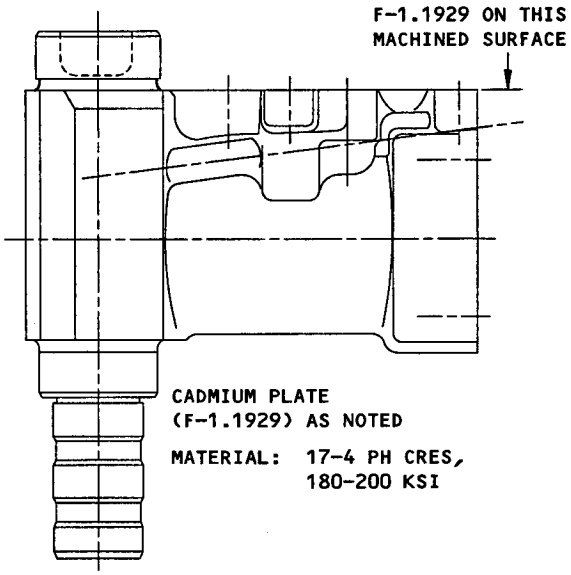
(4) Align the nameplate with prior nameplate and drive screws.

(5) For nameplate P/N BACN12A3MN: Install nameplate and secure with drive screws MS21318-13 (optional MS21318-19).

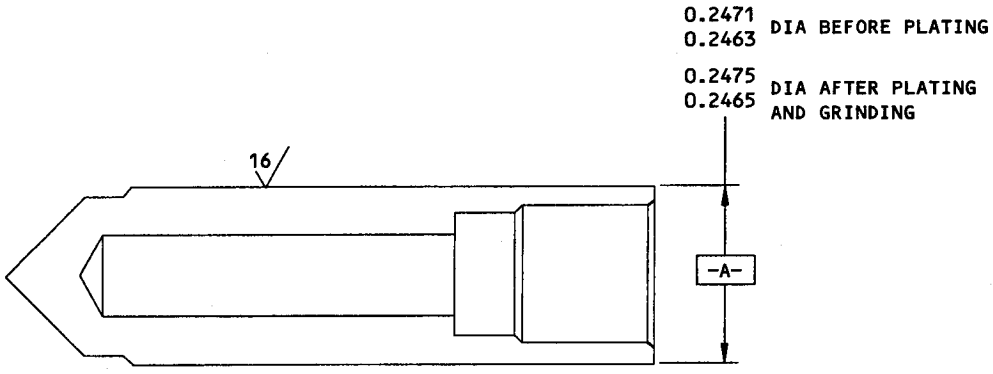
(6) For nameplate P/N BAC27DHY11: The nameplate uses a wrap around strap to secure the nameplate to the barrel (49, Fig. 1101).



END BEARING (33, FIG. 1101)



BARREL (49, FIG. 1101)



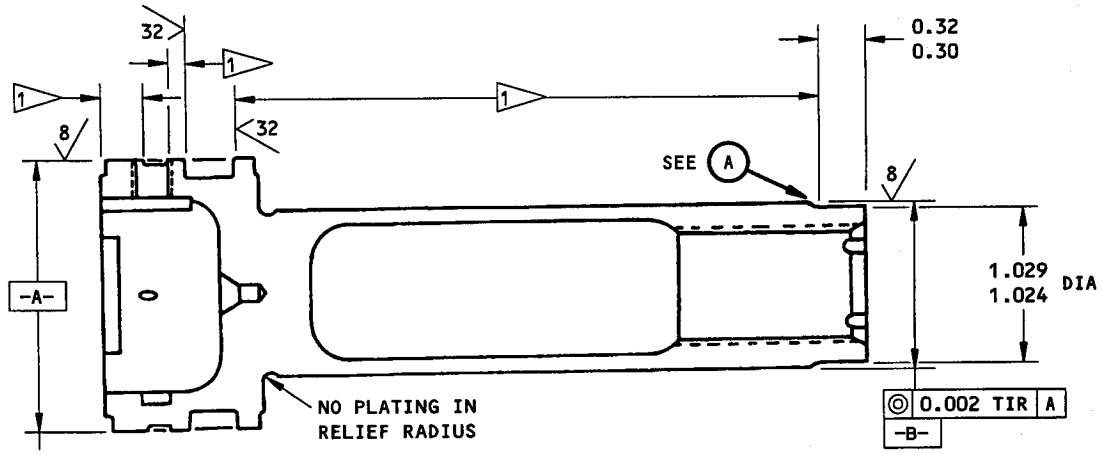
REFINISH

PASSIVATE (F-17.25, WHICH REPLACES 17.09) ALL OVER.
CHROME PLATE (F-15.03) DIA -A-

MATERIAL: 17-4 PH CRES, 180-200 KSI

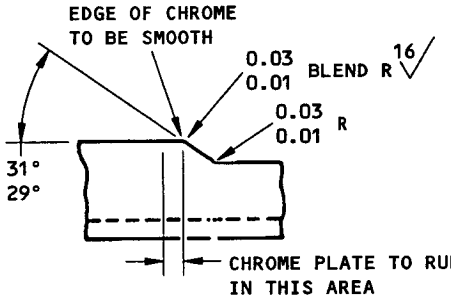
POPPET (40, FIG. 1101)

Refinish Diagram
Figure 401 (Sheet 1)



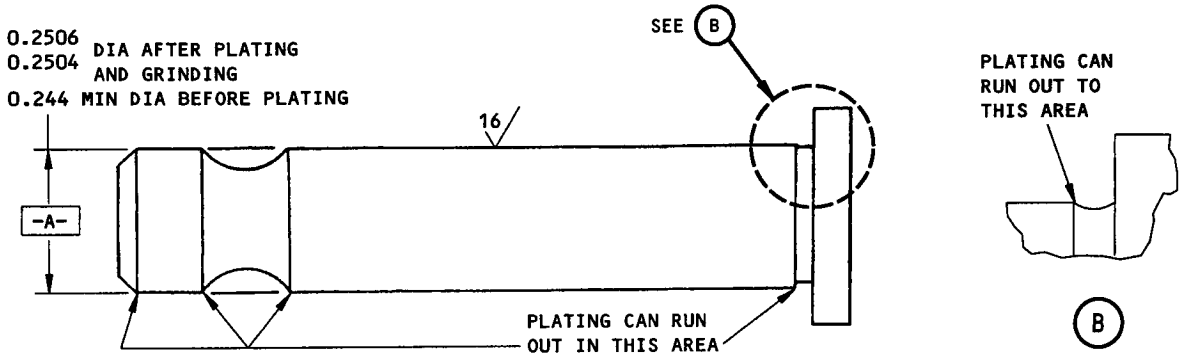
REFINISH

CHROME PLATE (F-15.03) DIAS -A-, -B-,
NO FINISH ON OTHER SURFACES.



(A) MATERIAL: 17-4PH CRES,
180-200 KSI

PISTON (45, FIG. 1101)



REFINISH

CHROME PLATE (F-15.03) DIA -A-
PASSIVATE (F-17.25, WHICH REPLACES F-17.09)
ALL OTHER SURFACES

125 ALL MACHINED SURFACES UNLESS SHOWN
DIFFERENTLY

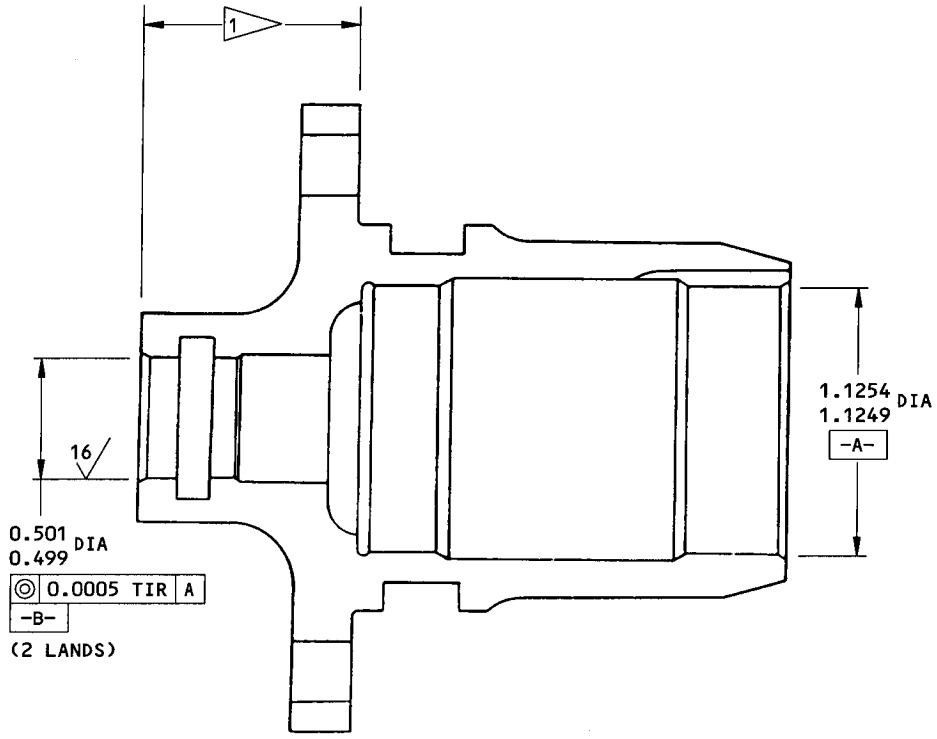
MATERIAL: 17-4 PH CRES, SOLUTION TREATED,
180-200 KSI

ALL DIMENSIONS ARE IN INCHES

PIN (14, FIG. 1102)

Refinish Diagram
Figure 401 (Sheet 2)

L94495



REFINISH

HARD ANODIZE (F-17.06) DIA -B-. CHROMIC ACID ANODIZE (F-2.26 OR F-17.02) OTHER SURFACES. APPLY PRIMER AND ENAMEL AS SHOWN BY 1 .

1 APPLY BMS 10-11, TYPE 1 PRIMER (F-20.02) AND BMS 10-60 ENAMEL (F-14.9813, WHICH REPLACES SRF-14.9813).

REPAIR

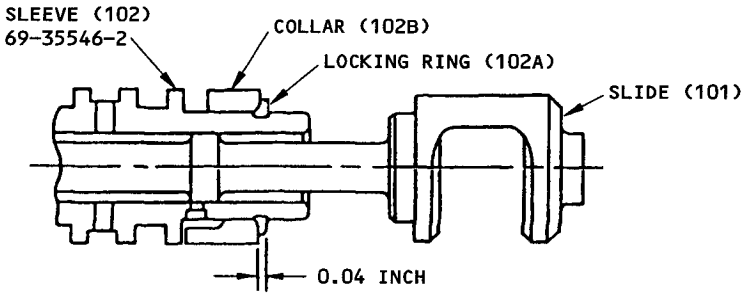
125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

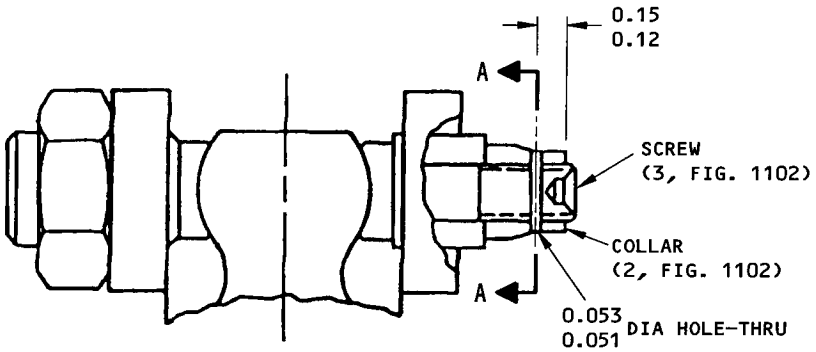
COVER (25, FIG. 1102)

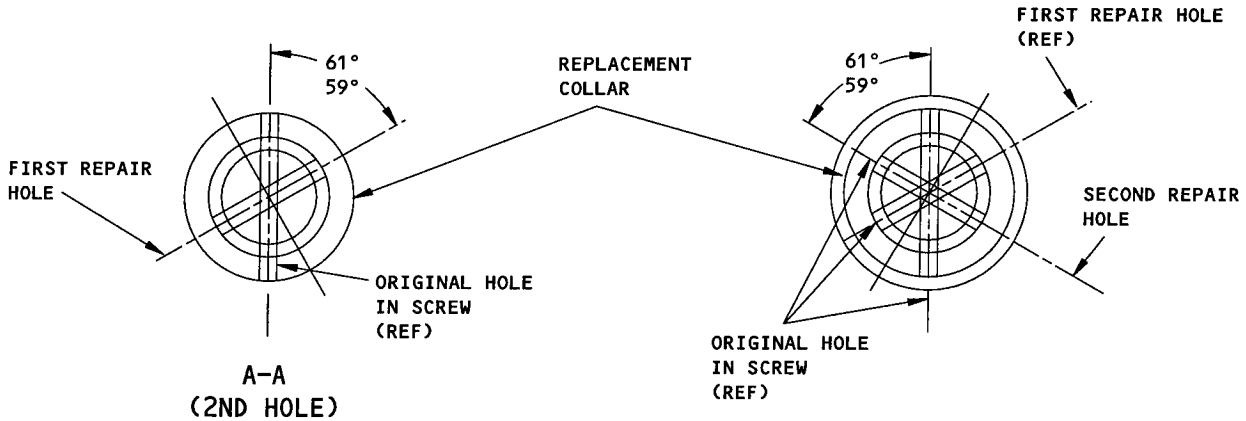
Refinish Diagram
Figure 401A



ITEM NUMBERS REFER TO FIG. 1101

Replacement Details
Figure 402





Collar Replacement
Figure 403

ASSEMBLY

1. Preassembly (See figures 1101 and 1102)

   A. Prior to assembly lightly lubricate all O-ring packings, backup rings, caps and all sliding parts with hydraulic fluid BMS 3-11. Skydrol Assembly Lube MCS 352 (Monsanto Chemical Corp., St. Louis, Mo.) may be used instead of hydraulic fluid.

   B. All detail parts must be thoroughly cleaned with solvent. Dry all parts in a dust-free environment. Flush all passages, cavities and parts with hydraulic fluid before parts are assembled.

2. Reassemble input assembly as shown on figure 1102:

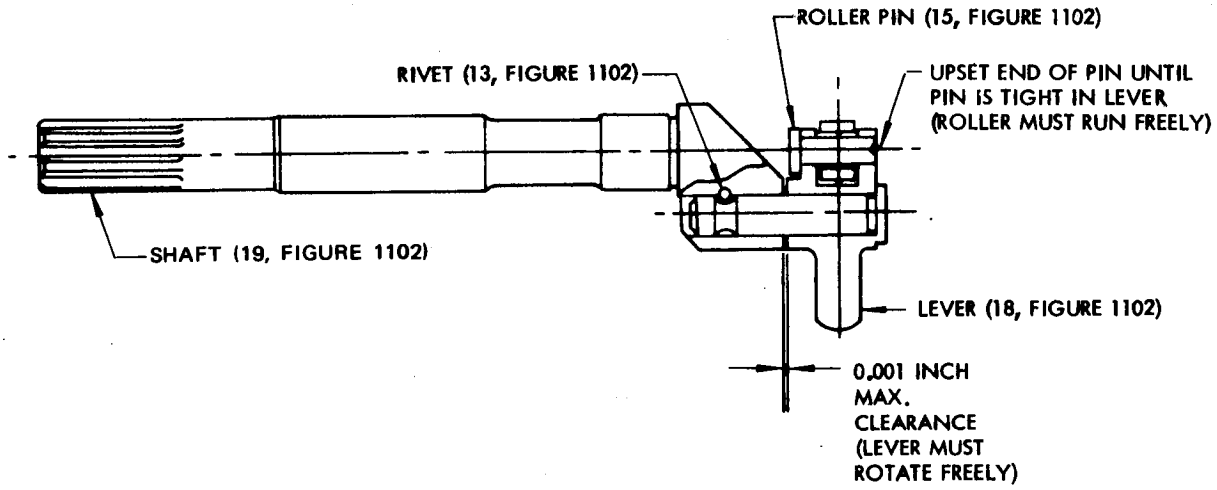
   A. Install packing (24) and cap ring (23) into cover (25). Press one bearing (20) into base of cover.

      NOTE: Item (20) is a P/N MKP8A bearing with seals and grease removed.

   B. Build up input shaft assembly (12):

      (1) Insert roller pin (15) part way into lever (18). Install spacer (16) and roller (17) and press pin (15) until pin is tight in lever. Make sure that roller (17) is free running.

      (2) Slip pin (14) into lever (18) and shaft (19). Install rivet (13) so that a clearance of 0.001 inch maximum exists between shaft and lever. Lever must rotate freely. See Assembly of Input Shaft, figure 501.



Assembly of Input Shaft
Figure 501

C. Slide other bearing (20), spacer (22) and spring (21) over end of shaft (19). Insert end of input shaft assembly (12) into cover (25). Make sure spring (21) projection mates with notch inside cover, and press components together until spacer (22) and bearing are firmly seated.

D. Hold assembled components together and slip washer (11), lever (10) and fork (9) onto shaft (19). Align groove on shaft with bolt hole in fork (9) and install bolt (6) and collar (5).

E. Run nut (4) onto screw (3). Insert screw part way into fork (9). Slip one bushing (7) in place between fork (9) and lever (10). Press screw through lever, engage other bushing (7) and spacer (8) and install collar (2) on end of screw. Tighten collar until operating torque of screw (3) is 15-35 lb-in. Break shear section of BACC30M8 collar. Drill hole through collar and screw (Fig. 403) and install roll pin (1). Recheck operating torque.

3. Assemble Power Control Unit (Fig. 1101)

CAUTION: 1. DO NOT PLACE UNIT IN ANY CLAMPING DEVICE OR DAMAGE TO UNIT MAY RESULT. FIXTURE TX150817 OR EQUIVALENT MAY BE USED TO HOLD UNIT DURING ASSEMBLY AND LOCKWIRE PROCEDURES.

2. HANDLE SLEEVE (102) AND SLIDE (101) ASSEMBLY WITH CARE. CONTACT WITH OTHER PARTS CAN DESTROY CRITICAL LAPPED SURFACES.

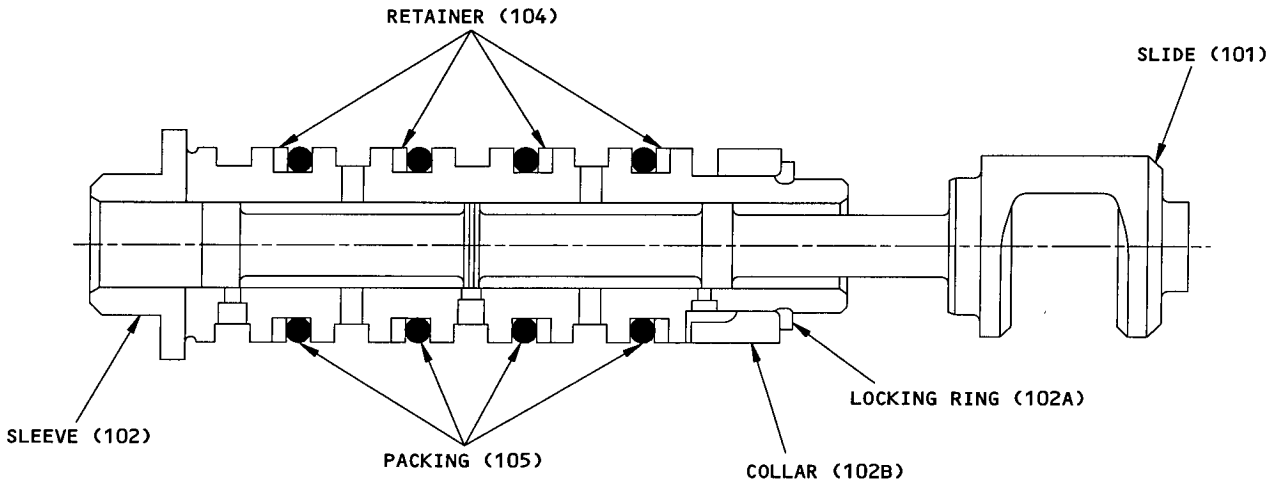
3. THE INSTALLED CONTROL VALVE SLIDE (101) MUST BE ORIENTED IN THE MANIFOLD (119) PER FIG. 1101. THE BOTTOM OF THE VALVE SLIDE (101) CLEVIS MUST BE PARALLEL TO THE BOTTOM OF THE INPUT ASSEMBLY BORE OR THE INPUT ASSEMBLY MAY BIND.

A. Install spring (103) on slide (101) and carefully insert slide into sleeve (102). Bring slide and sleeve together with installation tool, TX151029 or equivalent. Use O-ring sleeve TX150811 or equivalent and install one packing (105) and one retainer (104) in each of the four seal grooves on the outside of the sleeve. Make sure that the retainers are installed on the correct side of the packings, as shown in Fig. 501A. Install slide and sleeve assembly (100), collar (99A), and spring washer (99) in manifold assembly (107) and remove installation tool TX151029.

B. Place packing (98) on cap (97). Install cap into manifold assembly. Tighten cap to 200-250 lb-in.

C. Install retainers (95) and packing (96) onto filter (94). Insert filter into manifold. Place retainer (92) and packing (93) onto cap (91). Thread cap to engage approximately 2 threads and apply a light coating of grease, BATCO 8401, type 1 to exposed threads of cap. Tighten cap to 100-125 1b-in. After lockwiring cap, wipe off excess grease and clean contact line between cap and manifold assembly (107) with MEK. Then apply a bead of sealant, BMS 5-26, type 2 on contact line. Allow sealant to cure and check that sealant has bonded to the surfaces.

D. Install check valves (88) with retainers (89) and packings (90). Install packing (87) into cap (86). Tighten cap to 200-250 lb-in.



ITEM NUMBERS REFER TO FIG. 1101

Packing and Retainer Installation
Figure 501A

E. Place piston ring (84) onto step piston (85). Freeze piston ring and press piston (85) into port in manifold, until piston bottoms. Install piston ring (82) onto step piston (83). Freeze piston ring and press piston (83) into same port. Install piston (83) so that visible end is just below oil passage in manifold with outboard end approximately 0.50 inch below manifold face. Place retainers (80) and packing (81) on cap (79). Install cap with washers (78) and screws (77). Tighten screws to 81 - 99 lb-in.

F. Install retainers (75) and packing (76) onto piston (74). Thread inserting tool with a 1-64-UNC-3B thread into piston and press piston (74) firmly into recess at base of thermal relief valve port of manifold assembly (107). Remove inserting rod.

G. Install piston ring (73) onto piston (72). Thermally set spiral rings in a fixture at 400°F maximum to obtain a minimum of 0.000-inch/max. of 0.001-inch diametrical interference fit of seals to sealing surface. Once installed, piston and piston ring set (73, 72) are matched with the manifold.

NOTE: Spiral rings may be optionally thermal-set in manifold (119), provided the temperature does not exceed 275°F.

H. Press piston (72) into thermal relief valve port until it bottoms against piston (74). Slip plunger (69) into port. Insert spring (71) over plunger. Place retainer (67) and packing (68) onto sleeve (66) using O-ring sleeve, TX150809 or equivalent. Install correct thickness of shim (70) onto small end of sleeve (66) using installation tool, TX151034 or equivalent, and press sleeve into port until shim (70) bottoms on spring (71). Insert poppet assembly (63) into end of sleeve, slip in spring (62) and install cap (60) with packing (61). Tighten cap (60) to 200-250 lb-in.

J. On assemblies 65-44561-5, -6, -7 and -9, place retainers (58) and packing (59) onto plug (57). Press plug (57) into manifold assembly (107). Work packing (56) over threads of cap (55), using care to avoid damaging packing. Install cap on manifold and tighten to 200 - 250 lb-in.

CAUTION: COVER ON INPUT ASSY MUST BE POSITIONED ON MANIFOLD WITH OFFSET HOLES ALIGNED. INPUT LEVER MUST BE INSTALLED SO THAT SPRING PRELOAD WILL TURN INPUT LEVER COUNTERCLOCKWISE WHEN VIEWED FROM INPUT LEVER END OF POWER CONTROL UNIT.

K. Install retainer and packing (52, 53) on input assembly (54) cover. Align offset mounting holes of cover and manifold, align input assembly with ends of stepped pistons in manifold, and slide assembly into place. Offset hole of cover and manifold is nearest filter cap (91) when viewed towards mounting face of manifold (Fig. 502)

NOTE: In maximum tolerance conditions, it is possible to incorrectly install input assembly and mounting screws with offset holes not aligned.

L. Build up components inside barrel assembly (46) as follows:

(1) Place washer (39 or 39A) over end of seat (38). Slide poppet (40) and spring (41) into seat. Compress spring and snap assembled parts into position in head end of piston (45). Work cap ring (35A) or cap ring (36) and packing (37) over head of piston using installation tool, TX151031 or equivalent.

(2) Tighten seat (38) to 72-88 lb-in. Bend prongs of lockwasher (39A) so that prongs bear securely against flats on seat as shown (Fig. 502). Optionally on all except 65-44561-15 assembly, lockwire seat (38) to piston (45) (65-44569-1 only) using double twist method per 20-50-02. All lockwire loops and twisted ends must lie below surface indicated in Fig. 502. Twisted section must be closely fitted and taut when drawn thru piston anchor point. Use care not to shave wire when drawn through lockwire hole.

(3) Install piston (45) into barrel assembly (46).

(4) Place retainers (34) and packing (35) on outside diameter of end bearing (33). Install seal assembly (30A), or foot seal (31) and packing (32), in bearing and press bearing into place over end of piston (45).

(5) Install scraper (30) into seal retainer (29) and slide retainer over end of piston (45).

NOTE: Optional procedure to prevent corrosion to piston (45) and rod end (44), consists of completely filling piston (45) cavity with Batco 8401 No. 1 (or No. 2 optional) grease before inserting rod end (44) into piston (45).

(6) Install washers (28) and bolts (27) through retainer (29) and bearing (33) into barrel (46). Tighten and lockwire bolts per lockwire diagram, Fig. 502.

NOTE: Nut is not lockwired until Spoiler Power Control Unit is installed on airplane.

(7) Run nut (43) up onto threads of rod end (44), insert key (42) and install rod end into piston (45). Rod end length adjustment is made with fixture, TX150821 or equivalent. Apply a light coating of grease to exposed threads of rod end (44). Refer to lockwire diagram and assembly adjustment, Fig. 502. Tighten jamnut against piston to torque range of 200 to 250 pound-inches.

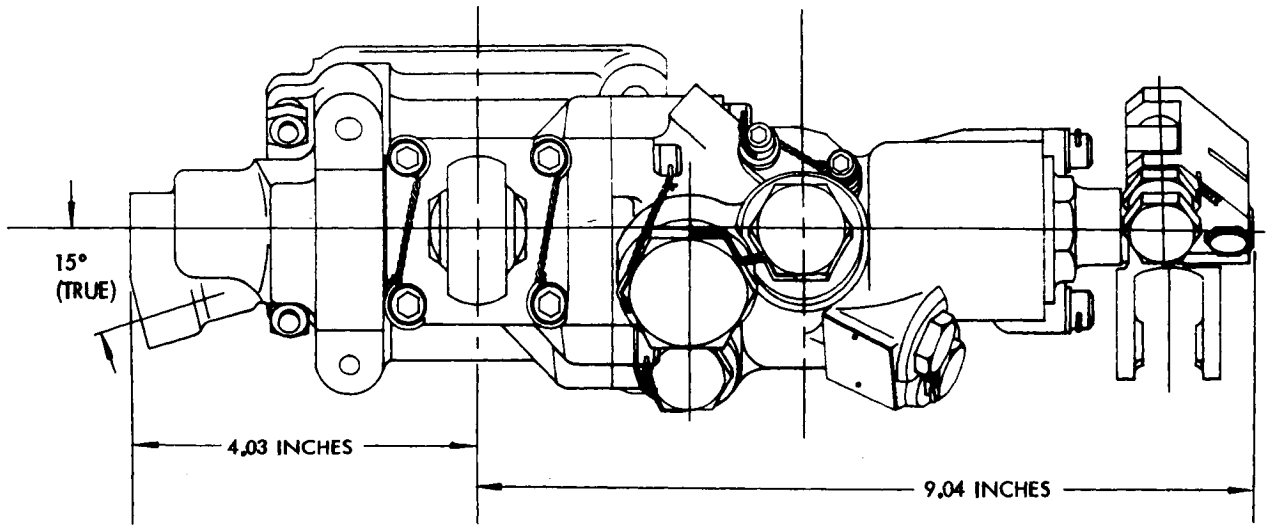
M. Assemble manifold, barrel and mounting bracket assembly (1):

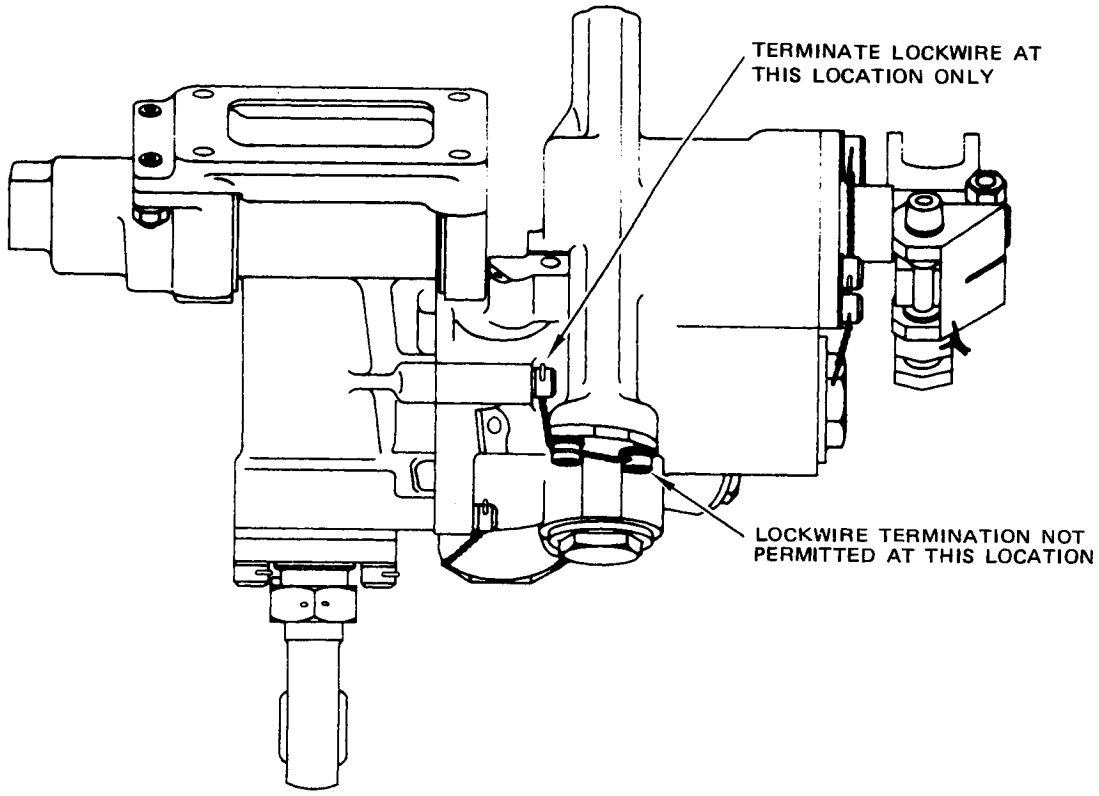
(1) Place retainers (25) and packing (26) on small end of transfer tube (24). Place retainers (22) and packing (23) onto large end of tube (24), and insert tube into correct port in manifold, as shown on Fig. 1101.

(2) Place retainers (19) and packings (20) onto both ends of the other three transfer tubes (21). Insert tubes into manifold assembly (107).

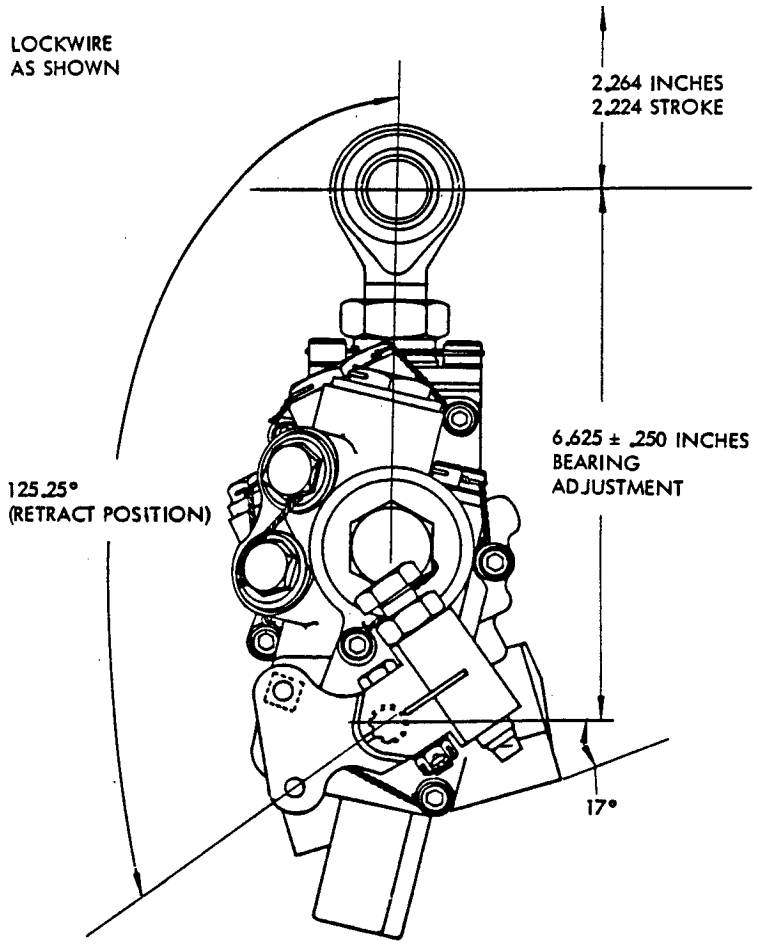
(3) Install barrel assembly (46) with associated parts to manifold assembly (107) using screws (17, 15, 13 and 11) and washers (18, 16, 14 and 12). Tighten screws to torque range of 81 to 99 pound-inches.

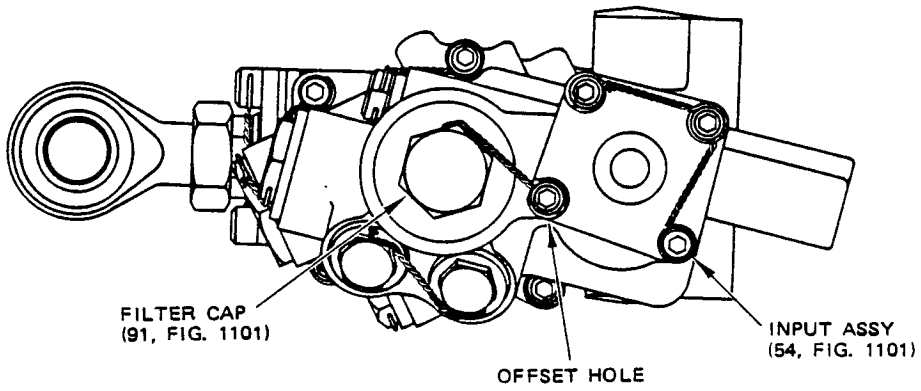
(4) Install seals (10) in three grooves in bore of journal (8). Slide barrel into journal (8). Attach bracket (7) with tapered pins (5), washers (4) and nuts (3). Check that shim (6) is securely bonded to bracket (7). If necessary, use BMS 5-92, Type 1 or 3 adhesive as specified in 20-50-12, Type 70 to bond the shim (6) to the bracket (7). Tighten nut (3) to a torque of 10 to 20 pound-inches and install cotter pin (2).



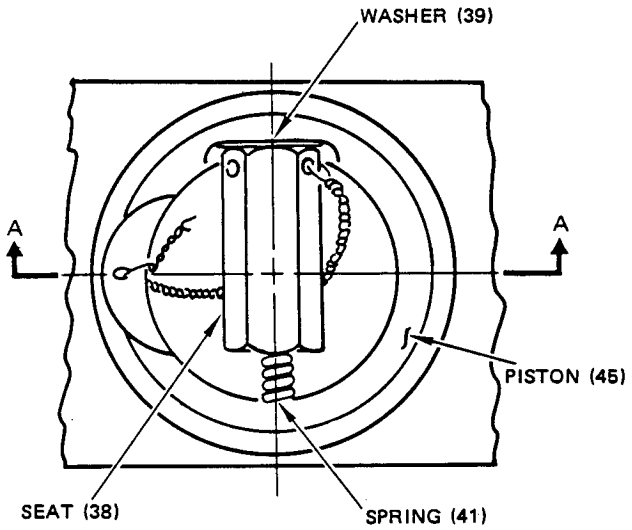


Lockwire Diagram and Assembly Adjustment
Figure 502 (Sheet 1)

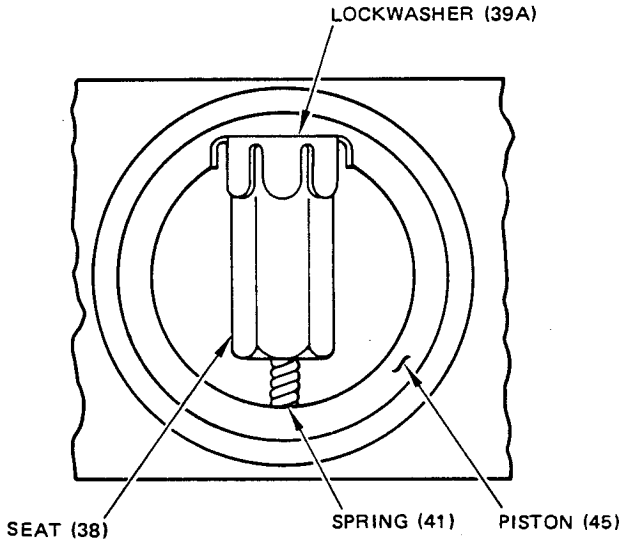




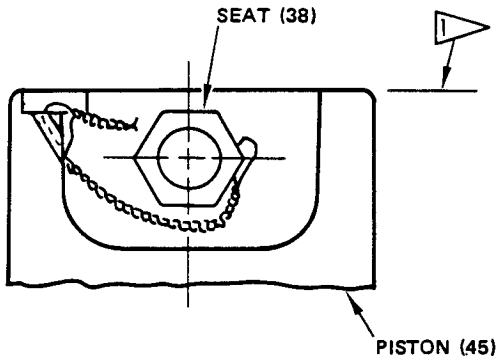
Lockwire Diagram and Assembly Adjustment
Figure 502 (Sheet 2)



65–44561–1 THRU –14
(OPTIONAL)



65–44561–1 THRU –15
(PREFERRED)

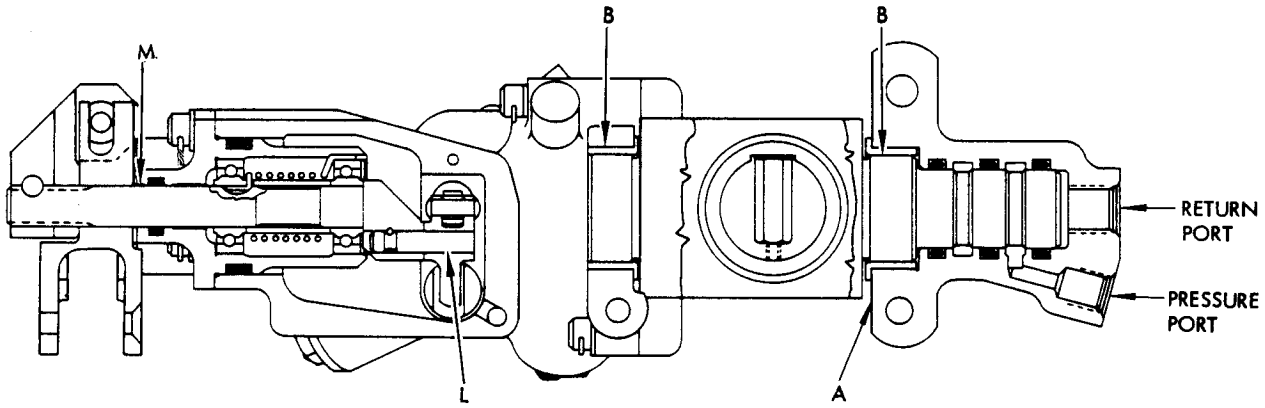


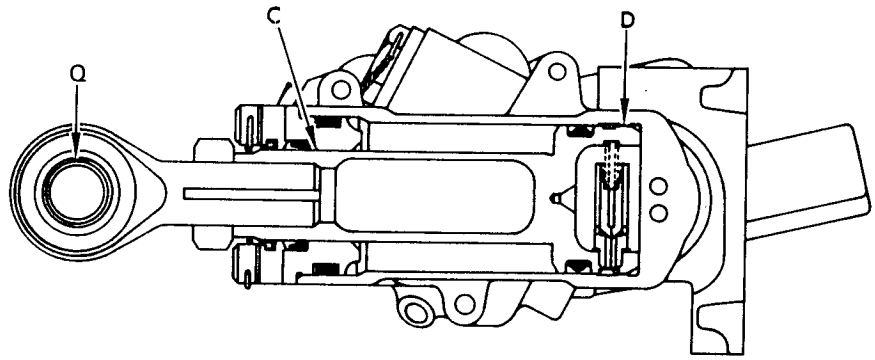
A–A

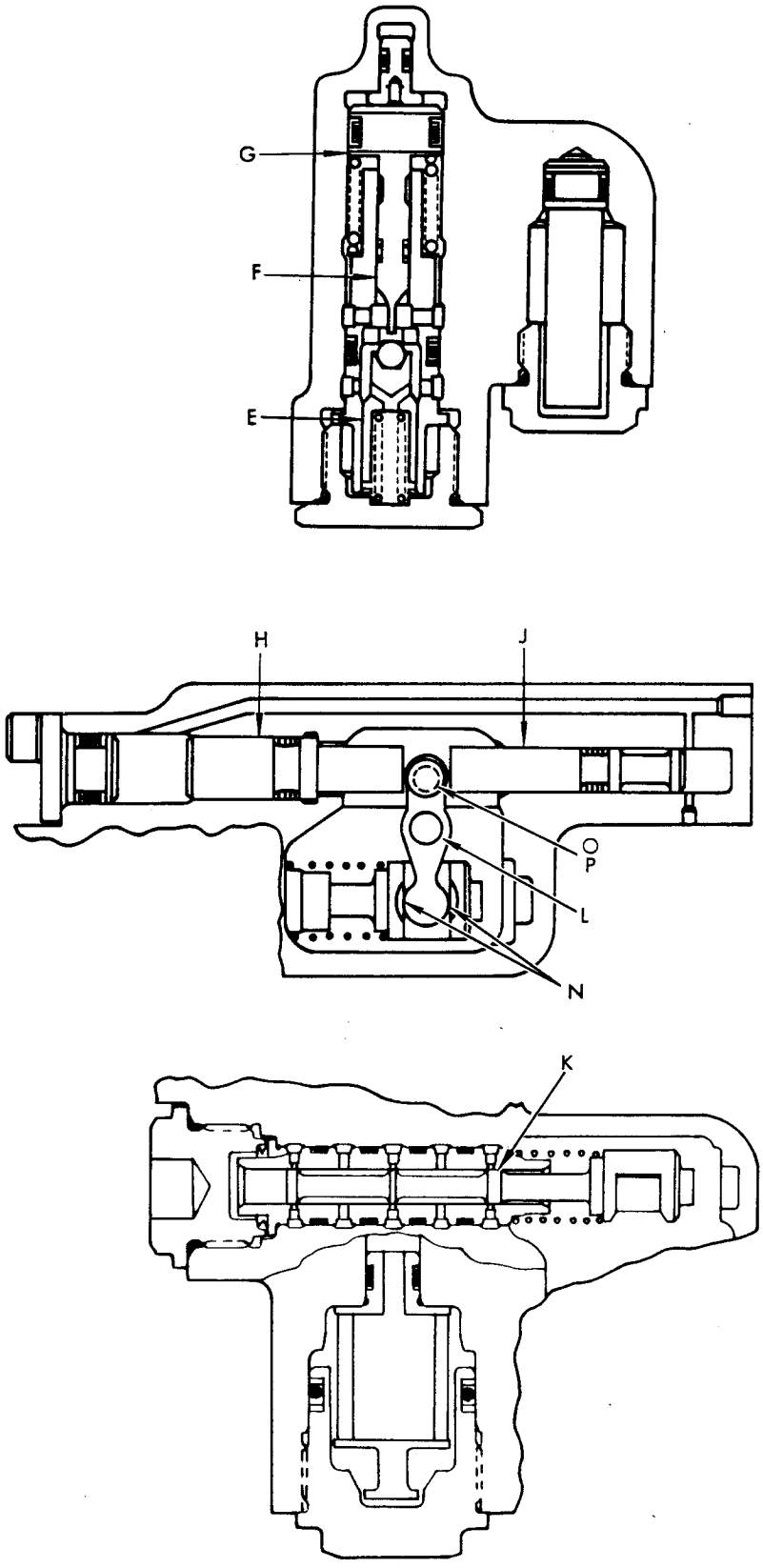
1 ALL LOCKWIRE LOOPS AND TWISTS SHALL BE BELOW THIS SURFACE

Lockwire Diagram and Assembly Adjustment
Figure 502 (Sheet 3)

FITS AND CLEARANCES







Fits and Clearances
Figure 601 (Sheet 2)

FITS AND CLEARANCES									
			Original Design Dimensions				Service Wear Limits		
Ref Letter Fig. 601	Mating Intex No. Fig. 1101		Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inch)		Maximum Allowable Clearance (inch)
			Min	Max	Min	Max	Min	Max	
A	ID	7	1.4385	1.4390	*[1]	0.0005			
	ID	8	1.4385	1.4390	*[2]				
B	ID	9	1.249	1.250	0.0005	0.002		1.2510	0.0025
	OD	49	1.2480	1.2485			1.2465		
C	ID	33	1.061	1.064	0.001	0.006		1.070	0.010
	OD	45	1.058	1.060			1.053		
D	ID	46	1.7400	1.7415	0.001	0.003		1.7470	0.006
	OD	45	1.7385	1.7390			1.7320		
E	ID	66	0.437	0.438	0.0015	0.0028		0.440	0.0050
	OD	63	0.4352	0.4355			0.433		
F	ID	66	0.2955	0.2965	0.0005	0.0025		0.2985	0.0050
	OD	69	0.2940	0.2950			0.292		
G	ID	107	0.738	0.740	0.0016	0.0048		0.742	0.0060
	OD	72	0.7352	0.7364			0.732		
H	ID	107	0.499	0.501	0.002	0.005		0.504	0.007
	OD	83	0.496	0.497			0.492		
J	ID	107	0.360	0.361	0.002	0.004		0.364	0.006
	OD	85	0.357	0.358			0.354		

Fits and Clearances
Figure 601 (Sheet 3)

		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	
K	ID 102 OD 101	0.312 0.312	*[3] *[3]	*[3] 0.00010	0.00015			
L	ID 18 (1102) OD 14 (1102)	0.2507 0.2504	0.2510 0.2506	0.0001	0.0006	0.2497	0.2516	0.0010
M	ID 25 (1102) OD 19 (1102)	0.499 0.4993	0.501 0.4998	0.0008	0.0017	0.4960	0.5028	0.0030
N	ID 101 OD 18 (1102)	0.3750 0.3746	0.3754 0.3749	0.0001 *[4]	0.0008	0.3737	0.3763	0.0015
O	ID 17 (1102) OD 16 (1102)	0.2500 0.2493	0.2505 0.3497	0.0003	0.0012			0.0015
P	ID 17 (1102) OD 15 (1102)	0.1877 0.1872	0.1883 0.1875	0.0002	0.0011			0.0015
Q	ID 44 OD *[5]	0.7495 0.748	0.7500 0.749	0.0005	0.002	0.7455	0.753	0.005 *[6]

*[1] Diameters of mated parts machined in-line after assembly
*[2] Journal is machined to align with mating surface of bracket
*[3] Slide and sleeve are a lapped and matched set
*[4] Diameter of 0.3746-0.3749 inch applies over 75 degrees included conical surface, with surface finish of 8 microinches
*[5] 69-43227 (rod end bolt bushing)
*[6] Radial play due to self-align liner wear

Fits and Clearances
Figure 601 (Sheet 4)

TESTING

1. General

   A. Two procedures for testing the unit are provided.

      (1) Procedure No. 1 tests the unit using a Boeing designed tool and does not require electrical monitoring or recording.

      (2) Procedure No. 2 uses vendor tools originally obtained from Weston or Ronson Hydraulics and also requires position transducers and an X-Y plotter.

   B. It is not necessary to test the unit by both procedures. Either procedure may be used depending on the tools in the customer's inventory. The vendor tools are no longer available and for future procurement the Boeing tool is recommended.

2. Test Procedure No. 1 (Fixture F80224-60)

   NOTE: Refer to Procedure No. 2 (par. 3) for test using other tooling and electrical monitoring and recording.

   A. Test Equipment

      (1) Hydraulic test stand with pressure controllable from zero to 5400 psi

      (2) 0-30 lb spring scale

      (3) Dial indicators

      (4) Hydraulic Fluid, BMS 3-11, filtered to 25 micron absolute

      (5) Flow measuring equipment for flow range zero to 2 gpm

      (6) Pressure gages

         (a) 0-30 psi

         (b) 0-3000 psi

         (c) 0-5400 psi

      (7) Graduated beaker - 0-100 cc

      (8) Test equipment F80224-60 (Supercedes F80224-1, -58)

(10) Test Manifold F80224-6

(11) Dummy Check Valve F80224-75 (replaces TX150806)

NOTE: Test Equipment F80224-60 replaces fixtures TX10967-4, -6 (piezometer), TX150796 (flow curve test), TX150804 (positional accuracy), TX150806 (dummy check valve and port), TX 150820 (loading and cycling), and TX150821 (setting and checking) which are used in Procedure No. 2.

B. Preparation for Test (Fig. 1101)

(1) Conduct test at room temperature, 70-100°F (21-38°C) using hydraulic fluid BMS 3-11.

(2) Install hydraulic fittings (Fig. 1103).

(3) Bleed manifold, assembled unit, and test system as follows:

WARNING: OPERATOR SHOULD WEAR SUITABLE PROTECTIVE CLOTHING AND GOGGLES, AVOIDING ALL UNNECESSARY SKIN CONTACT WITH HYDRAULIC FLUID.

(a) Connect pressure port to hydraulic pressure source. Open return port. Return port should be open to drain during all tests unless otherwise specified. See Fig. 701 for schematic of manifold test ports.

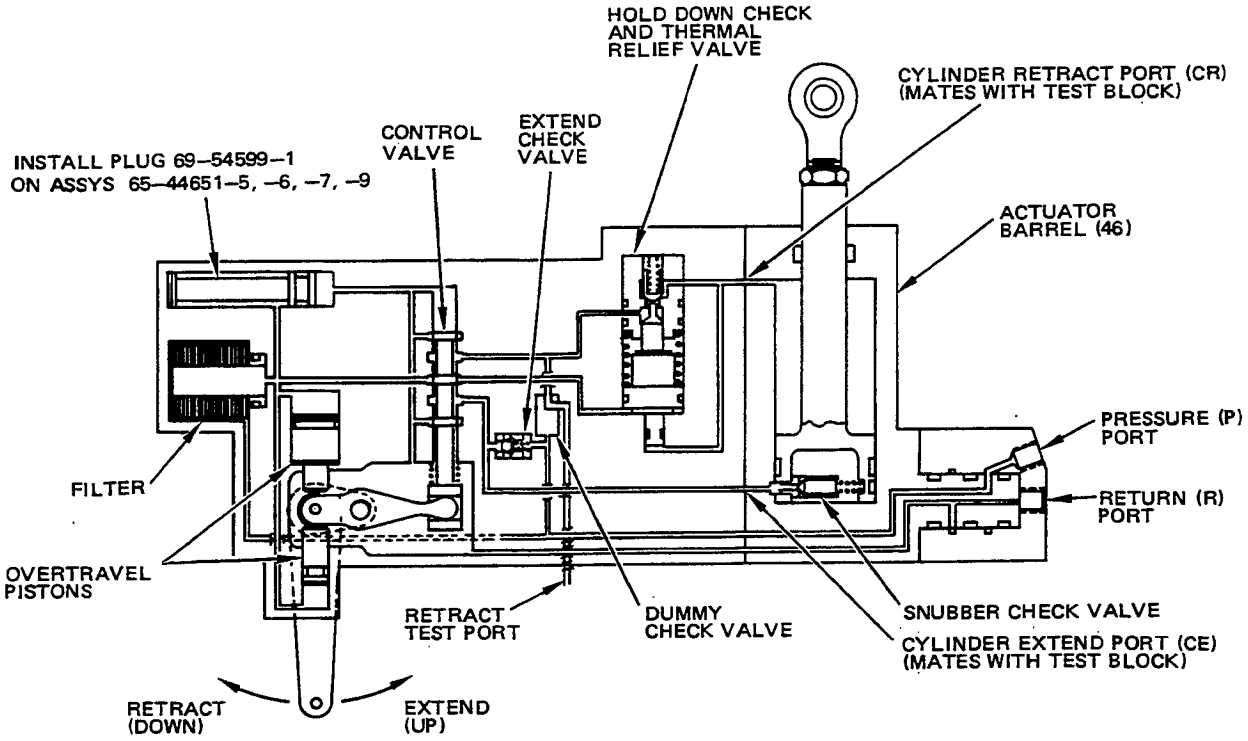
(b) Aim return port away from personnel. Loosen plugs on manifold.

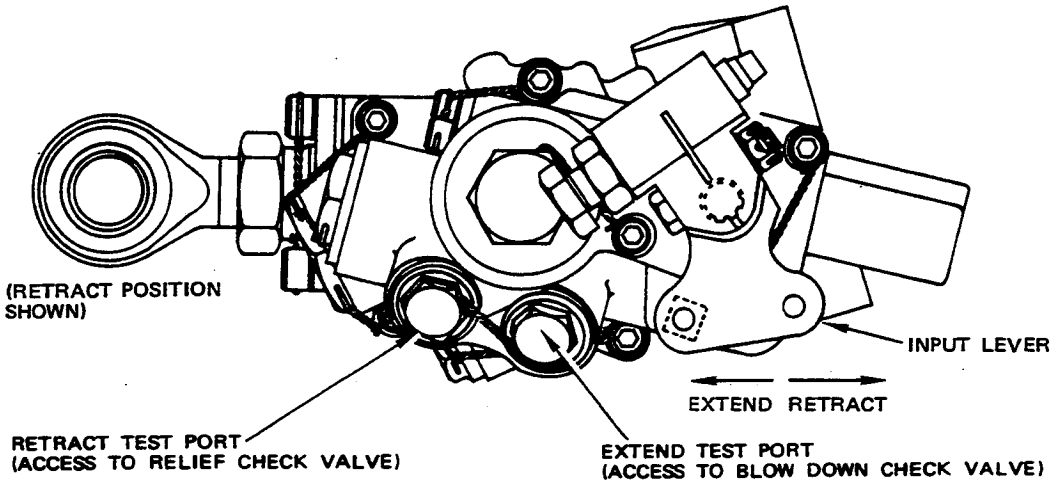
(c) Gradually increase pressure at pressure port. When aeration at manifold plugs ceases, tighten plugs.

(4) When preparing to test the complete assembly, cycle unit several times by moving input lever (54) until fluid from return port flows smoothly and continuously, without aeration. Check that force to move input assembly does not exceed 275 lb-in. at 3000 psi inlet pressure; operation of piston should be smooth, showing no signs of sticking and binding in either direction.

(5) Test Manifold F80224-6, is used in place of barrel (46) to conduct gage balance, pressure gain, leakage, flow versus stroke, relief and check valve tests. Unit is then assembled and remaining tests conducted in any sequence. See Fig. 701 for location of check valves and test ports.

(6) The Extend position is obtained by moving the input lever toward the piston rod end (forward). The Retract positon is obtained by moving the input lever in the opposite direction (rearward).





Test Port Locations and Schematic Diagram
Figure 701

(7) "Units in service" referred to in the test procedures are units removed due to known or suspected malfunctioning characteristics, or units which have been partially overhauled for replacement of seals. Units which meet the service limits may be returned to service without overhaul. Unless otherwise stated, test limits for "units in service" are same as for overhauled units.

NOTE: Steps 2.C thru 2.F are not required for units in service except when units have known or suspected malfunctioning characteristics.

C. Thermal Relief Valve Operation

(1) Minimum Operating Pressure

(a) Install thermostat valve (57) into manifold (107) and install test manifold F80224-6.

(b) Connect ports P and R to hydraulic pressure source (Fig. 701).

(c) Install dummy check valve F80224-75 in place of "retract" check valve (88).

NOTE: Make sure that all air is bled from unit.

(d) Install drip tube at retract test port. Supply hydraulic fluid to port CE, maintain 5-psi pressure at port CR, and block fluid to ports P and R.

(e) Move input lever to full extend position (Fig. 702). Gradually increase port CE pressure from zero, until flow occurs through retract test port. Check that relief valve opens at 100-psi min pressure. Add or remove shims (70, Fig. 1101) as required to obtain desired pressure. Refer to par. 3.H. of ASSEMBLY.

(2) Thermal Relief Pressure

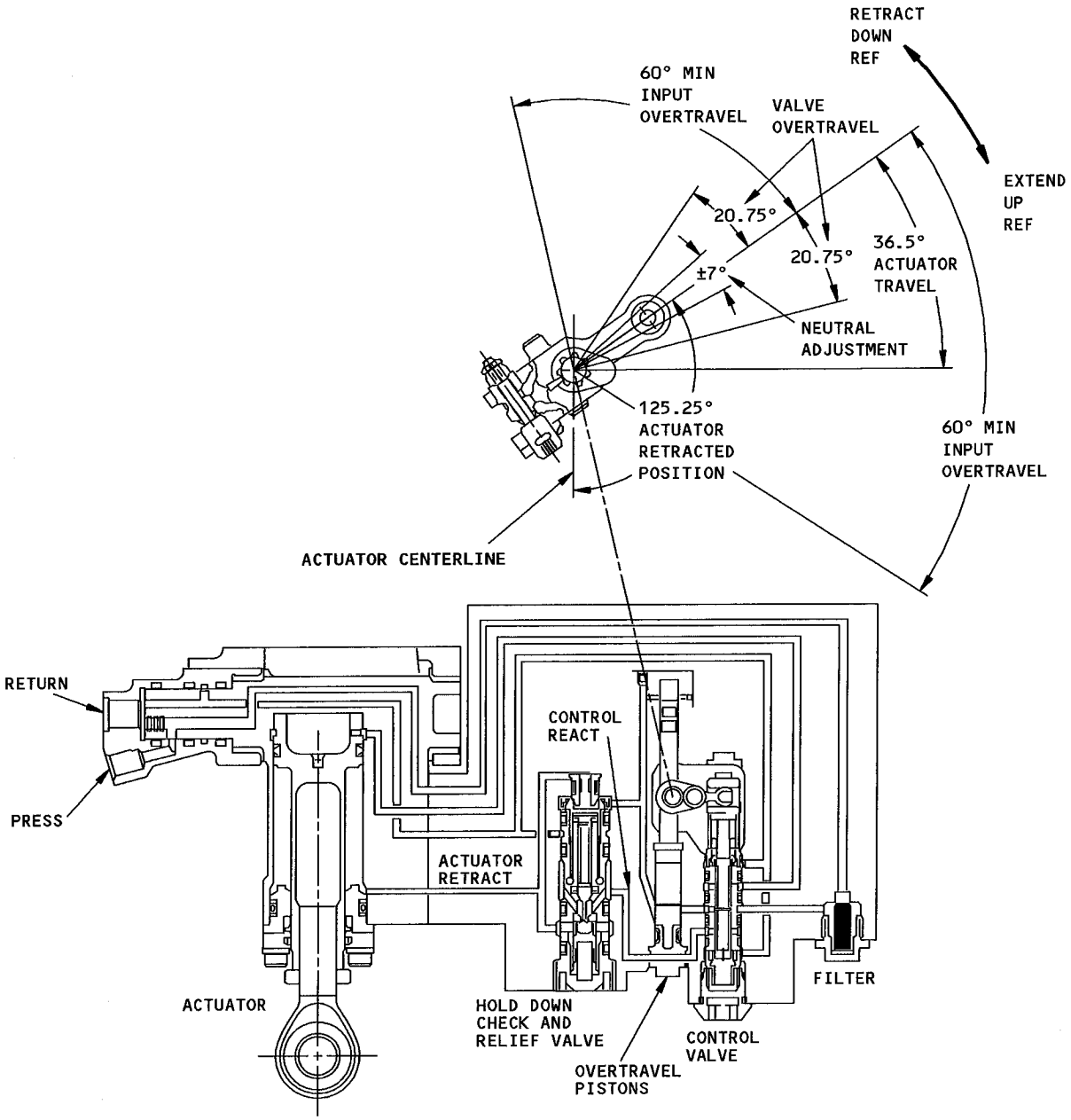
(a) Place input lever at neutral. Apply hydraulic pressure to port CR, and increase pressure until flow occurs through retract test port. Check that flow is 5 drops per minute minimum at 4000-psi max pressure.

(b) Reduce pressure to 2800 psi minimum. After 20-second wait, check that flow does not exceed 5 drops in 1 minute.

(3) Thermal Relief Flow

(a) Connect retract test port to drain through flowmeter. Apply hydraulic pressure to port CR until flow from retract test port is 1.2 gpm. Check that inlet pressure does not exceed 4900 psi.

(b) Reduce pressure to 2100 psi. After 20-second wait, check that leakage at retract test port does not exceed 5 drops per minute at 2100 psi.



SPOILERS NO. 2, 3, 6, & 7

Input Lever Kinematics
Figure 702

D. Check Valve Operation

(1) Cracking Pressure (Fig. 703)

(a) Install manifold (107) to test manifold, F80224-6. Install dummy check valve F80224-75 in place of "retract" check valve (88). Install pressure gage to retract test port on manifold. Apply pressure to inlet port P.

NOTE: Ensure that all air is bled from unit and test setup.

(b) Move input lever to full retract position.

(c) Increase supply pressure until flow occurs at port CR. Check that cracking pressure is 2-5 psi.

(d) Reduce pressure until flow ceases.

(2) Check valve full flow.

(a) Install differential pressure gage across retract test port and CR.

(b) Connect pressure source to retract test port, and connect a flowmeter to port CR.

(c) With springs (62, 71), poppet assembly (63), sleeve (66), plunger (69) and shim (70) removed, increase the inlet pressure until a flow of 2.0 gpm occurs. Record the pressure drop. Reinstall the springs, poppet assembly, sleeve, plunger and shim, then increase the inlet pressure until a flow of 2.0 gpm occurs. Record the pressure drop. Subtract the first pressure recorded from the second pressure recorded. Make sure the resulting pressure is less than 30 psid. This result is the pressure drop caused by springs, poppet assembly, sleeve and plunger.

E. Flow Control Valve Operation

(1) During flow control tests, connect pressure gages to ports CE and CR. Install unit in Test Fixture F80224-60 (Fig. 703).

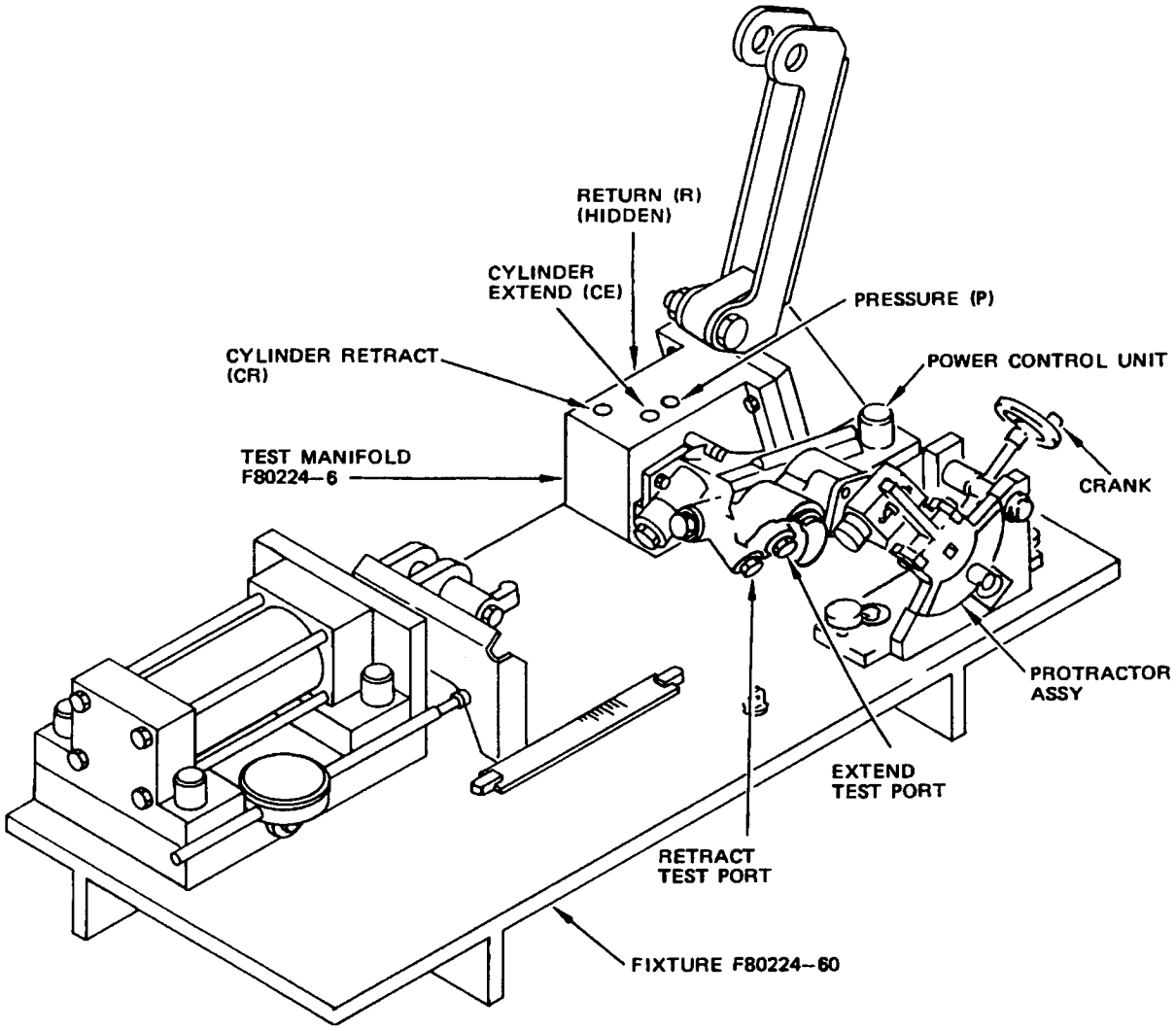
(2) Gage Balance

(a) Close cylinder port interconnect valve and apply 3000 psi inlet pressure. Adjust input lever until cylinder pressures are equal within 50 psi.

(b) Set input lever indicator on test fixture to zero reference position. Check that cylinder port pressures are equal within 50 psi and are:

1) 1000-2000 psi on new or overhauled units.

2) 300-2700 psi on units in service.



Flow Curve Test
Figure 703

(3) Pressure Gain

(a) Close cylinder interconnect valve and apply 3000 psi inlet pressure.

(b) Move input lever slowly from 0.005-inch retract to 0.005-inch extend. Check that differential pressure at cylinder port at 0.0025 inch either side of neutral is:

1) 2000 psi min for new or overhauled units.

2) 500 psi min for units in service.

(4) Internal Leakage - Neutral

(a) Install flow gage in return line downstream from unit. Close cylinder port interconnect valve.

(b) Apply 3000 psi to pressure port. Check that control valve leakage at neutral (cylinder port pressures equal) does not exceed:

1) 400 cc per minute for units with new or overhauled slide and sleeve assemblies

2) 2000 cc per minute for units with slide and sleeve assemblies which have been in service.

(5) Internal Leakage - Extreme Travel

(a) Provide same test setup used in step (4) and 3000 psi differential pressure.

(b) Move input lever 20 degrees from neutral toward retract position.

(c) Repeat step (b) except move lever to extend position.

(d) At each position, check that measured internal leakage with 3000 psi cylinder differential pressure does not exceed:

1) 30 cc per minute for new or overhauled units.

2) 100 cc per minute for units in service.

(6) Valve Breakout Force

(a) Install valve in same test setup used for Gage Balance Check.

(b) Using input lever, move valve in each direction from neutral, after a 1 minute waiting period for each direction. Spool motion is evidenced by cylinder port differential pressure. Check that breakout force does not exceed 5.0 lb-in. at the input point in the extend direction, and that actuator retracts when input lever is released.

F. Rod End Adjustment

(1) Rotate rod end (44) as required to fit into arm F80224-4 on test fixture (Fig. 704), with actuator retracted (Ref Assembly Adjustment, Fig. 502). After adjusting bearing, tighten nut (43) to 200-250 lb-in.

NOTE: Nut is lockwired as shown in Fig. 502, after completion of tests and installation check on airplane.

G. Assembled Power Control Unit

(1) Alignment Check (Not required for units in service)

(a) Remove hold down check and thermal relief valve (65, 72) from manifold.

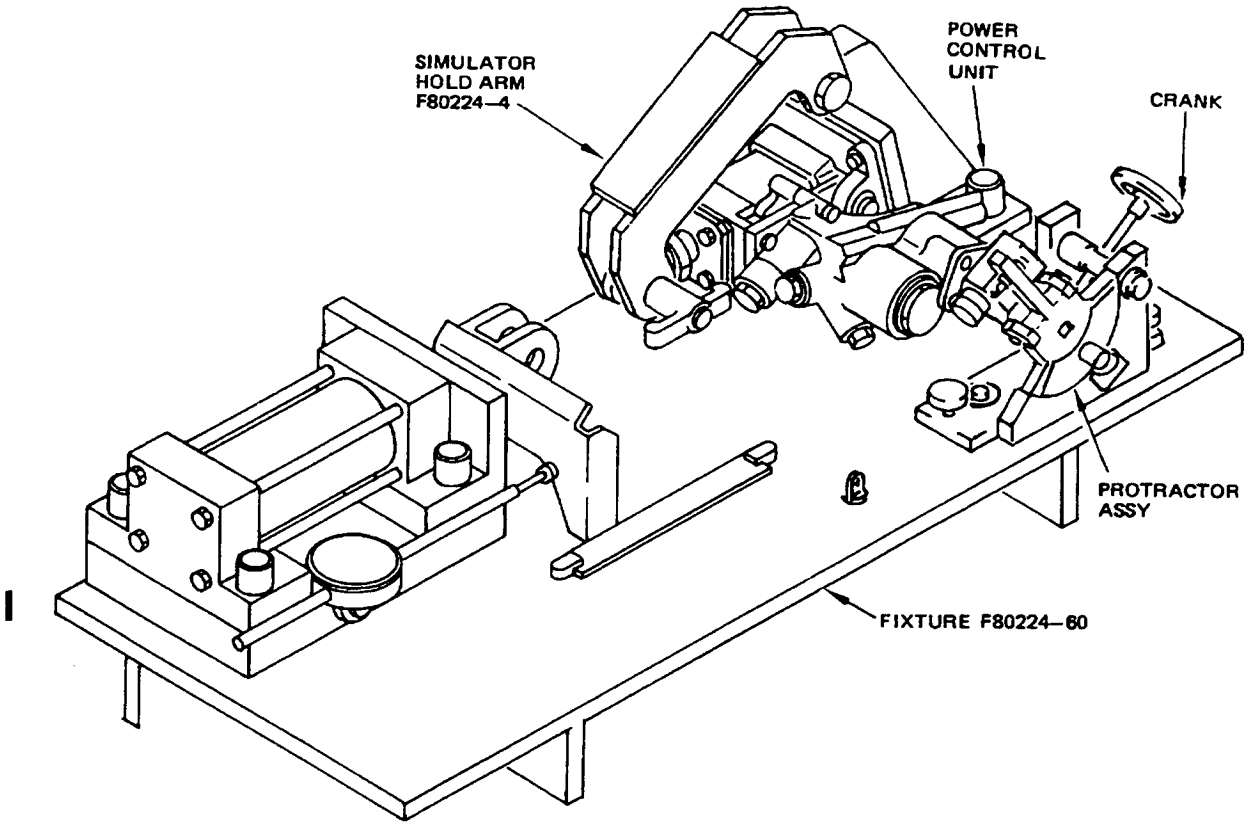
(b) Move piston (45) thru one full stroke with no hydraulic pressure in assembly. Hold bracket (7) in a fixed position, and rotate unit back and forth on bearings (9). Check that there is no binding or roughness during operation. After check, replace valve parts.

(2) Proof Pressure Test (Not required for units in service)

(a) With unit in fixture F80224-60, connect pressure port to hydraulic pressure. Apply 3000 psi to pressure port. Connect return port to drain.

(b) Move input lever to retract position. Allow piston (45) to bottom, and then slowly increase pressure to 5400 psi and hold for 60 seconds. Check that there is no external leakage or permanent set. Reduce pressure to zero.

(c) Apply 3000 psi to pressure port and move input lever to extend position. Allow piston (45) to reach fully extended position, and then slowly increase pressure to 5400 psi and hold for 60 seconds. Check that there is no external leakage or permanent set. Reduce pressure to zero.



Positional Accuracy Test
Figure 704

(d) With return port plugged, apply 900 psi to pressure port. Move input lever from full retract to full extend several times until piston (45) ceases to respond. Hold at 900 psi for 60 seconds. Check that there is no external leakage or permanent set. Reduce pressure to zero.

(3) Low Pressure Proof Test

(a) Connect pressure and return ports to hydraulic pressure. Apply 5 psi to both ports simultaneously, and hold pressure for 1 minute.

(b) Reduce pressure to zero, and then repressurize both ports to 5 psi for 1 minute. Check that there is no external leakage.

(4) Output Resolution - Lever Stroke (Fig. 705)

(a) Mount vernier protractor unit (F80224-32 of fixture) on fixture and input lever. Refer to Paragraph 2.E(2) for gage balance instructions to zero the Vernier Protractor. Engage tension spring on fixture with input lever. Connect simulator hold arm to rod end.

CAUTION: ONCE THE INPUT LEVER HAS BEEN MOVED TOWARD EITHER THE EXTEND OR RETRACT CHECK POSITIONS, DO NOT REVERSE LEVER DIRECTION OR TEST RESULTS WILL NOT BE VALID.

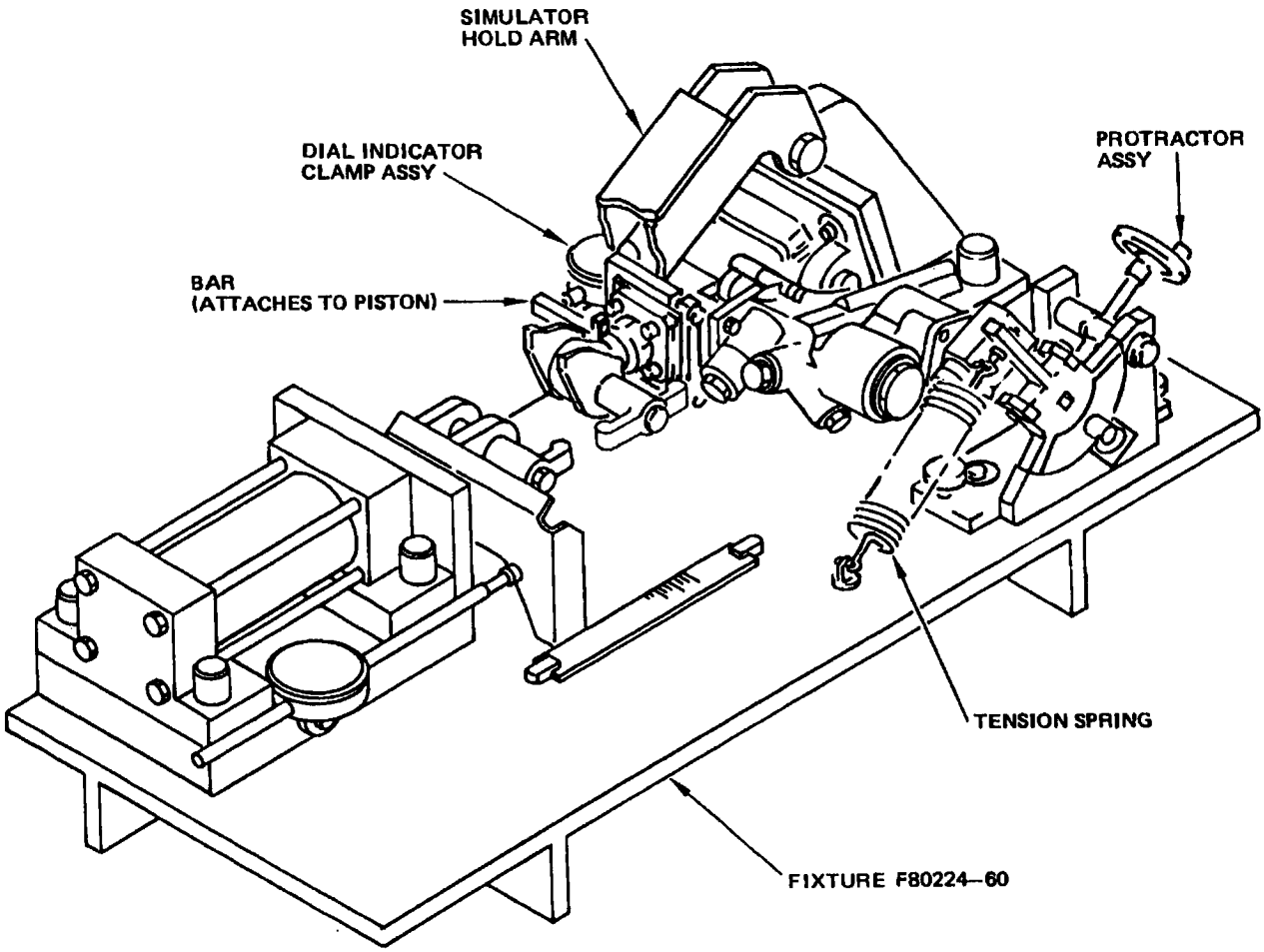
(b) Apply 3000 psi to pressure port. Move lever to full retract position using hand crank on fixture.

(c) From full retract position, move input lever to the 2 degree (retract) position. Do not move lever in reverse direction at any time. Adjust dial indicator at piston so it reads zero at this piston position.

(d) Move input lever to the 5 degrees (extend) position then back to the 2 degree (retract) position while checking piston position. (Note: 355 degree protractor reading equals 5 degrees extend position.) While moving lever to or from the 5 degree position, do not reverse direction of movement at any time. Total piston cycle time should be greater than 5 seconds. The difference in piston lengths in the extend and retract directions (total deviation) shall not exceed:

1) 0.006 inch (new or overhauled unit)

2) 0.029 inch (units in service)



Output Resolution Check
Figure 705

(e) Repeat procedure (b).

(f) Repeat procedure (c) except set zero index after moving input lever to the 12 degree position.

(g) Repeat procedure (d) except move input lever to the 15 degree position and back to the 12 degree index position. Limits shall be the same.

(5) Snubbing Action (Not required for units in service)

(a) Make certain that PCU assembly is completely bled of air.

(b) With no inlet pressure applied, manually stroke unit from fully extended to fully retracted through one complete cycle.

(c) Check that definite snubbing action occurs within 0.20 inch from the end of piston stroke in retract direction. Check that piston moves out of fully retracted position without noticeable snubbing or restriction.

(6) Hold-Down Check Valve Leakage (Fig. 706)

(a) Apply 3000 psi to pressure port, move input lever to retract position and bottom piston (45). Reduce pressure to zero.

(b) Apply tension load of 4200-4600 pounds to piston rod. After an initial extension of 0.030 inch maximum, check that piston movement does not exceed additional 0.05 inch during a 5 minute period.

(c) Reduce tension load to 2400 pounds. Apply 3000 psi to pressure port and move input lever to position the piston at 1.0 $\pm$0.5 inch extension. Reduce the pressure from 3000 to 0 psi at uniform rate of approximately 500 psi per second and hold for 2 minutes. Maintain the 2400 pounds tension load. After an initial extension of 0.03 inch max, check that piston motion does not exceed an additional 0.02 inch during the 2 minutes.

(7) Dynamic Leakage Check (Fig. 706)

(a) Connect the simulator hold arm.

(b) Apply 3000 psi to pressure port.

(c) Cycle the unit at a rate not exceeding 1 inch per second. Actuate the unit for 25 cycles. There shall be no chatter, instability or external leakage at any static seal.

(d) Check that leakage does not exceed one drop within number of cycles as follows:

1) New or overhauled units -- 25 cycles at piston rod seal (37); 100 cycles at rotary seals (10).

2) Units in service -- 5 cycles at piston rod seal (37); 25 cycles at rotary seals (10).

(8) Piston Stroke (Fig. 706)

(a) Apply 3000 psi to the pressure port. Fully extend piston and check that:

1) Piston travel is 2.224-2.264 inches

2) Input lever travel is approximately 36.5 degrees

(b) With no pressure applied, slowly move input lever from zero position to full extend, then back to zero and full retract. Check that lever travel is minimum of 60 degrees each side of neutral.

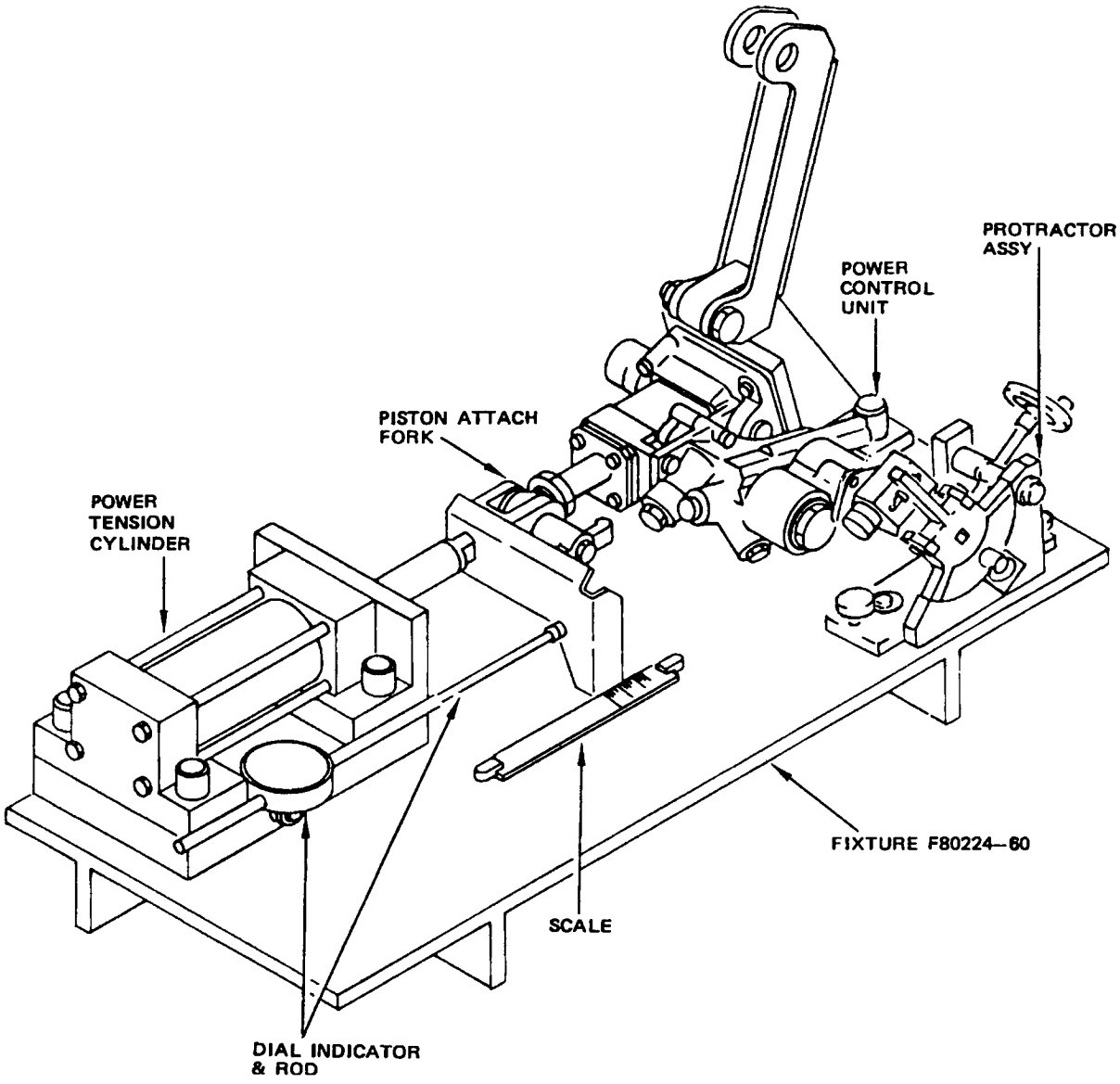
(c) With 3000 psi applied check that the piston is retracted and input lever is free.

(9) Lever Force

(a) Disconnect rod end of PCU from fixture, permitting piston (45) to be free to move. Apply 3000-psi to pressure port and 50-psi to return port. Move input lever through one complete cycle, including overtravel. Check that force required to move lever does not exceed 275 lb-in.

(b) Apply zero pressure to pressure port, and move lever through one complete cycle. Check that force required to move input lever does not exceed 20 lb-in.

(c) Check that there is no play in input lever.



Hold-Down Check Valve Leakage, Dynamic
Seal/Load, Piston Stroke Test
Figure 706

3. Test Procedure No. 2

NOTE: Refer to Procedure No. 1 (par. 2) for test which eliminates the requirement for electrical monitoring and recording and for special equipment no longer available.

A. Test Equipment

(1) Hydraulic test stand with pressure controllable from zero to 5400 psi

(2) 0-30 lb spring scale

(3) Dial indicators

(4) Hydraulic Fluid, BMS 3-11, filtered to 25 micron absolute

(5) Flow measuring equipment for flow range zero to 2 gpm

(6) Pressure gages

(a) 0-30 psi

(b) 0-3000 psi

(c) 0-5400 psi

(7) Graduated beaker - 0-100 cc

B. Special Equipment:

NOTE: The following items of test equipment or their equivalent are required to perform tests using Procedure No. 2. TX-series numbers represent tooling originally manufactured by Weston Hydraulics, or Ronson Hydraulics Unit Corp.

(1) TX10967-4 -- Piezometer

(2) TX10967-6 -- Piezometer

(3) TX150796 -- Flow Curve Test Fixture

(4) TX150804 -- Positional Accuracy Fixture

(5) TX150806 -- Dummy Check Valve

(6) TX150820 -- Loading and Cycling Fixture

(7) TX150821 -- Setting and Checking Fixture

(8) X-Y Recorder

(a) Model HP7045B, Hewlett Packard Co., Corporate HQ, 3000 Hanover St., Palo Alto, California 94304-1112

(b) Model HP7090A, Hewlett Packard Co., Corporate HQ, 3000 Hanover St., Palo Alto, California 94304-1112

(c) Model XY530T, Esterline Electronics Corp., Costa Mesa, California 92626-1437

C. Preparation for Test

(1) Conduct test at room temperature, 70-100°F (21-38°C) using hydraulic fluid BMS 3-11.

(2) Install hydraulic fittings per Fig. 1103.

(3) Bleed manifold, or assembled unit, and test setup as follows:

WARNING: OPERATOR SHOULD WEAR SUITABLE PROTECTIVE CLOTHING AND GOGGLES, AVOIDING ALL UNNECESSARY SKIN CONTACT WITH HYDRAULIC FLUID.

(a) Connect pressure port to hydraulic pressure source. Open return port. Return port should be open to drain during all tests unless otherwise specified. See Fig. 707 for schematic of manifold test ports.

(b) Aim return port away from personnel. Loosen plugs on manifold.

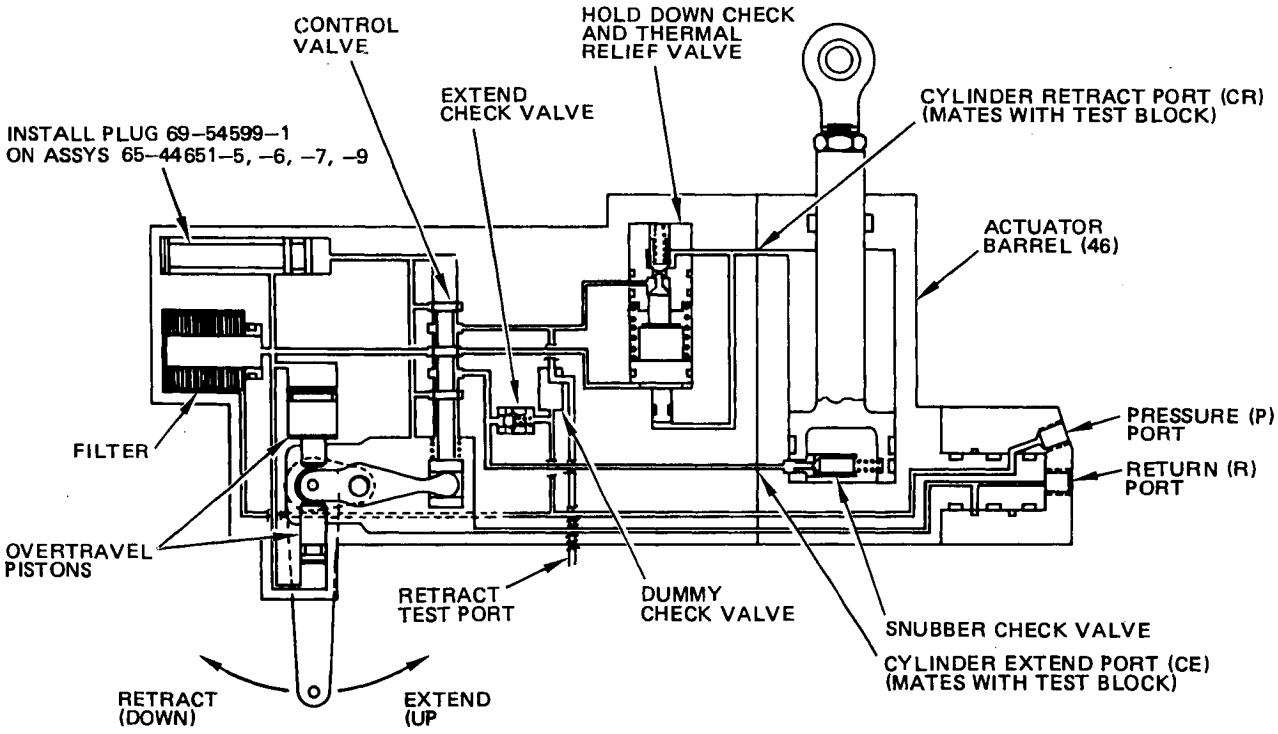
(c) Gradually increase pressure at pressure port. When aeration at manifold plugs ceases, tighten plugs.

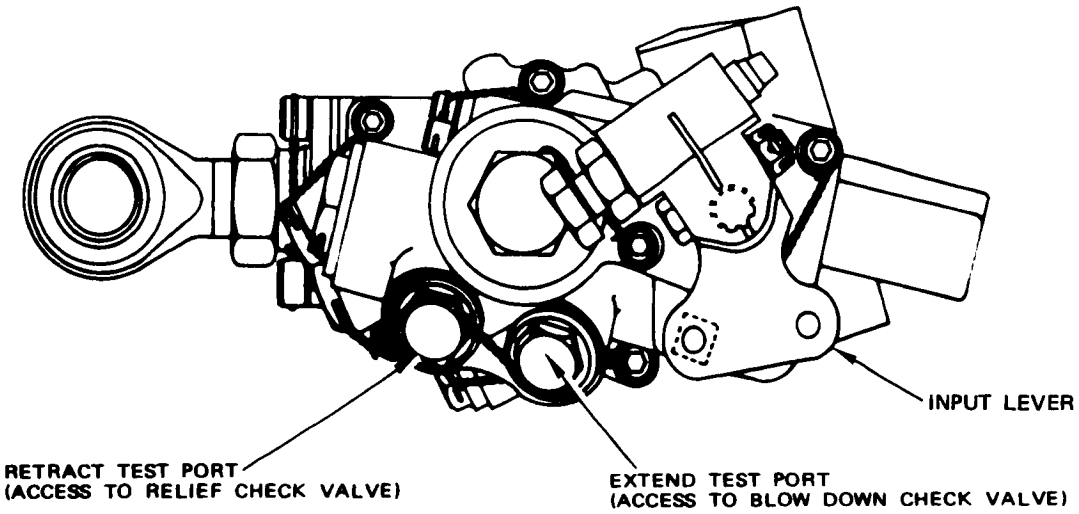
(4) When preparing to test the complete assembly, cycle unit several times by moving input lever (54) until fluid from return port flows smoothly and continuously, without sign of aeration. Check that force to move input assembly does not exceed 275 lb-in. at 3000 psi inlet pressure; operation of piston should be smooth, showing no signs of sticking and binding in either direction.

(5) Test Fixture TX150796 is used in place of barrel (46) to conduct gage balance, pressure gain, neutral leakage, flow versus stroke, relief and check valve tests. Unit is then assembled and remaining tests conducted in any sequence. When viewing actuator output rod end, with lever on left, two check valves are on top left, just above filter. Check valve toward output rod is in retract test port, the other is in extend test port (Fig. 707).

(6) The Extend position is obtained by moving the input lever toward the piston rod end (forward). The Retract position is obtained by moving the input lever in the opposite direction (rearward).

(7) "Units in service" referred to in the test procedures are units removed due to known or suspected malfunctioning characteristics, or units which have been partially overhauled for replacement of seals. Units which meet the service limits may be returned to service without overhaul. Unless otherwise stated, test limits for "units in service" are same as for overhauled units.





Test Port Locations and Schematic Diagram
Figure 707

D. Thermal Relief Valve Operation (Fig. 1101)

NOTE: These tests are not required for units in service except when units have known or suspected malfunctioning characteristics.

(1) Minimum Operating Pressure

(a) Install thermostat valve (57) into manifold (107) and install manifold on test manifold TX150796-018.

(b) Connect ports P and R to hydraulic pressure source (Fig. 707).

(c) Install dummy check valve TX150806 in place of "retract" check valve (88).

NOTE: Ensure that all air is bled from unit.

(d) Install drip tube at retract test port. Supply hydraulic fluid to port CE, maintain 5-psi pressure at port CR, and block fluid to ports P and R.

(e) Move input lever to full extend position (Fig. 702). Gradually increase port CE pressure from zero, until flow occurs through retract test port. Check that relief valve opens at 100-psi min pressure. Add or remove shims (70, Fig. 1101) as required to obtain desired pressure. Refer to par. 3.A. of ASSEMBLY.

(2) Thermal Relief Pressure

(a) Place input lever at neutral. Apply hydraulic pressure to port CR, and increase pressure until flow occurs through retract test port. Check that flow is 5 drops per minute minimum at 4000-psi max pressure.

(b) Reduce pressure to 2800 psi minimum. After 20-second wait, check that flow does not exceed 5 drops in 1 minute.

(3) Thermal Relief Flow

(a) Connect retract test port to drain through flowmeter. Apply hydraulic pressure to port CR until flow from retract test port is 1.2 gpm. Check that inlet pressure does not exceed 4900 psi.

(b) Reduce pressure to 2100 psi. After 20-second wait, check that leakage at retract test port does not exceed 5 drops per minute at 2100 psi.

E. Check Valve Operation

NOTE: These tests are not required for units in service except when units have known or suspected malfunctioning characteristics.

(1) Cracking Pressure (Fig. 708)

(a) Install manifold (107) on test manifold, TX150796-018. Install pressure gage to Retract Check Valve Test Port. Apply pressure to inlet port P.

NOTE: Ensure that all air is bled from unit and test setup.

(b) Move input lever to full retract position.

(c) Increase supply pressure until flow occurs at port CR. Check that cracking pressure is 2-5 psi.

(d) Reduce pressure until flow ceases.

(2) Check valve full flow.

(a) Install piezometers, TX10967-4 and TX10967-6 and differential pressure gage across Retract Test Port and CR.

(b) Connect a pressure source to Retract Check Valve Test Port, and connect a flowmeter to port CR.

(c) Increase inlet pressure until a flow of 2.0 gpm occurs. Check that pressure drop does not exceed 30 psi, corrected for losses due to external plumbing and connections between gages and actuator ports.

F. Flow Control Valve Operation

NOTE: These tests are not required for units in service except when units have known or suspected malfunctioning characteristics.

(1) During flow control tests, connect pressure gages to ports CE and CR. Install unit in Flow Curve Test Fixture TX150796 (Fig. 708).

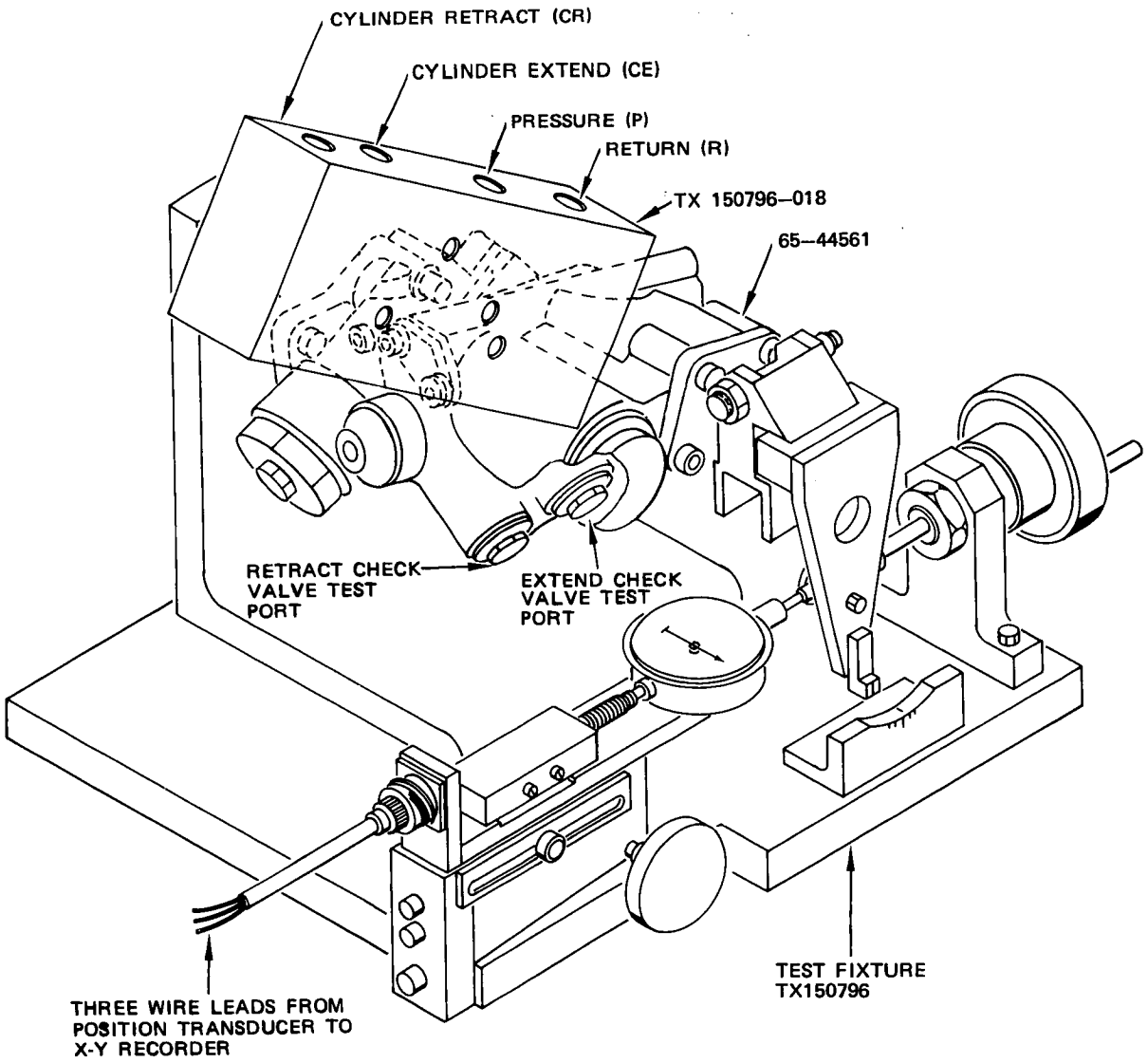
(2) Gage Balance

(a) Close the cylinder port interconnect valve and apply 3000 psi inlet pressure. Adjust input lever until cylinder pressures are equal within 50 psi.

(b) Set input lever indicator on TX150796 to zero reference position. Check that recorder cylinder port pressures are equal within 50 psi and are:

1) 1000-2000 psi on new or overhauled units.

2) 300-2700 psi on units in service.



Check Valve, Flow Control Valve Test
Figure 708

(3) Pressure Gain

(a) Close cylinder interconnect valve and apply 3000 psi inlet pressure.

(b) Move input lever slowly from 0.005-inch retract to 0.005-inch extend. Check that differential pressure at cylinder port at 0.0025 inch either side of neutral is:

1) 2000 psi min for new or overhauled units.

2) 500 psi min for units in service.

(4) Internal Leakage - Neutral

(a) Install flow transducer in return line downstream from unit. Attach a position transducer to input lever. Close cylinder port interconnect valve.

(b) Apply 3000 psi to pressure port. Check that control valve leakage at neutral (cylinder port pressures equal) does not exceed:

1) 400 cc per minute for units with new or overhauled slide and sleeve assemblies

2) 2000 cc per minute for units with slide and sleeve assemblies which have been in service.

(5) Internal Leakage - Extreme Travel

(a) Provide same test setup used in step (4) and 3000 psi differential pressure.

(b) Move input lever 20 degrees from neutral toward retract position.

(c) Repeat step (b) except move lever to extend position.

(d) At each position, check that measured internal leakage with 3000-psi cylinder differential pressure does not exceed:

1) 30 cc per minute for new or overhauled units.

2) 100 cc per minute for units in service.

(6) Valve Breakout Force

(a) Install valve in same test setup used for Gage Balance Check.

(b) Using input lever move valve in each direction from neutral, after a 1 minute waiting period for each direction. Spool motion is evidenced by cylinder port differential pressure. Check that breakout force does not exceed 5.0 lb-in. at the input point in the extend direction, and that actuator retracts when input lever is released.

G. Rod End Adjustment

NOTE: These steps are not required for units in service except when units have known or suspected malfunctioning characteristics.

(1) Install unit, completely assembled except for manifold (107), on Setting and Checking Fixture, TX150821, as shown in Fig. 709.

(2) Rotate rod end (44) as required to obtain a rigged length of 6.625 inches, with actuator retracted (Ref Assembly Adjustment, Fig. 502). After adjusting bearing, tighten nut (43) to 200-250 lb-in.

NOTE: Nut is lockwired as shown in Fig. 502, after completion of tests and installation check on airplane.

H. Assembled Spoiler Power Control Unit

(1) Alignment Check (Not required for units in service)

(a) Remove hold down check and thermal relief valve (65, 72) from manifold.

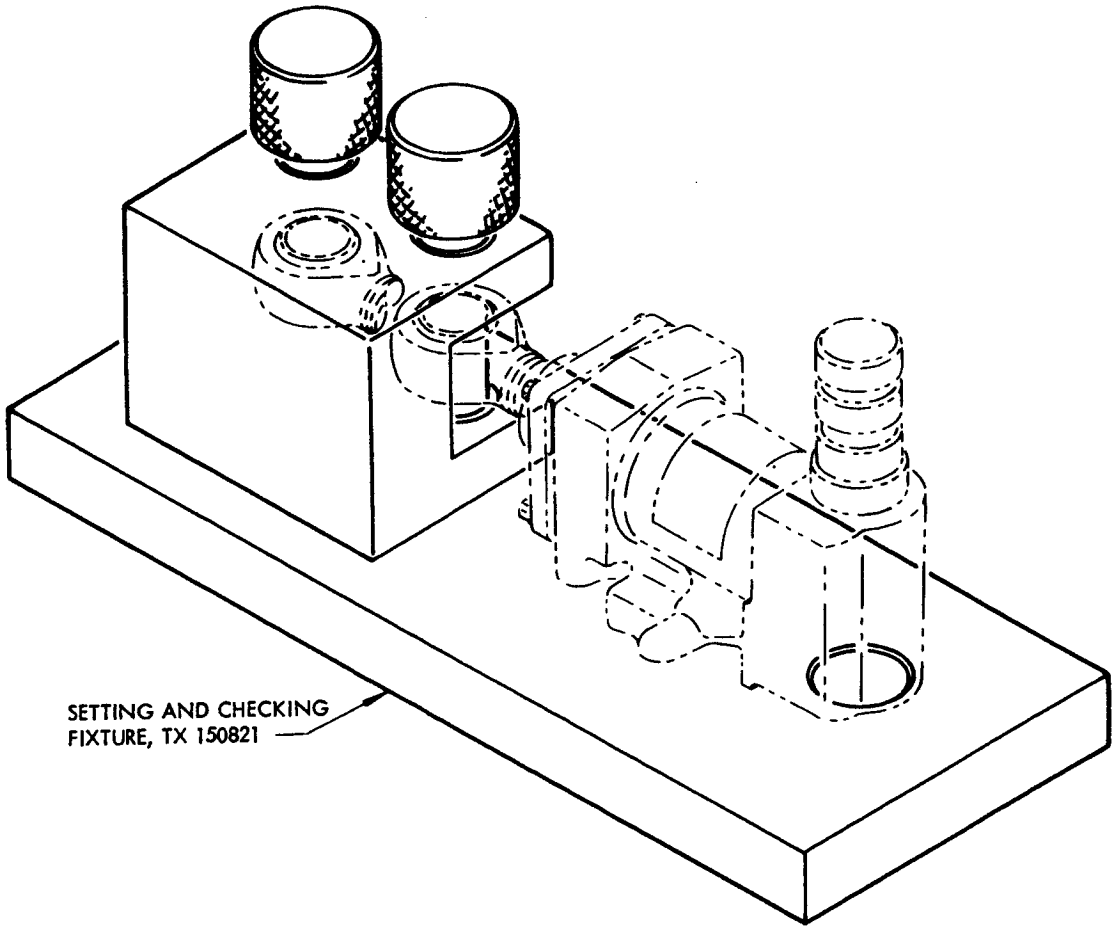
(b) Move piston (45) thru one full stroke with no hydraulic pressure in assembly. Hold bracket (7) in a fixed position, and rotate unit back and forth on bearings (9). Check that there is no binding or roughness during operation. After check, replace valve parts.

(2) Proof Pressure Test (Not required for units in service)

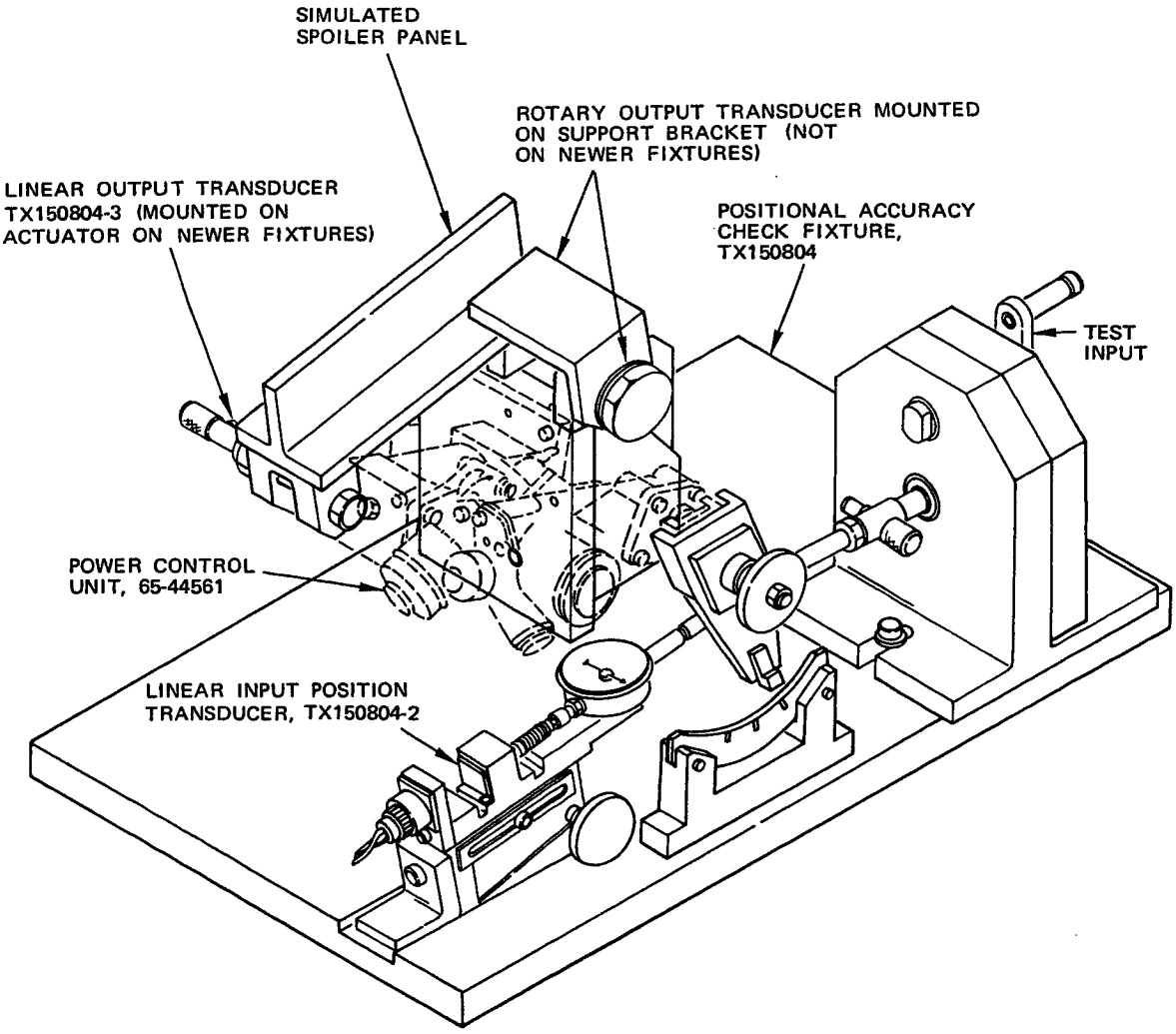
(a) Install assembly in Positional Accuracy Fixture, TX150804, as shown in Fig. 710. Connect inlet port to hydraulic pressure. Apply 3000 psi to inlet port. Connect return port to drain.

(b) Move input lever to retract position. Allow piston (45) to bottom, and then slowly increase supply pressure to 5400 psi and hold for 60 seconds. Check that there is no external leakage or permanent set. Reduce pressure to zero.

(c) Apply 3000 psi to inlet port and move input lever to extend position. Allow piston (45) to reach fully extended position, and then slowly increase supply pressure to 5400 psi and hold for 60 seconds. Check that there is no external leakage or permanent set. Reduce pressure to zero.



Rod End Adjustment
Figure 709



Positional Accuracy/Output Resolution Check
Figure 710

(d) Connect return port to hydraulic pressure. Apply 900 psi to return port, with the inlet port plugged.

(e) Move input lever to retract position. Allow piston (45) to bottom, and hold at 900 psi for 60 seconds. Check that there is no external leakage or permanent set. Reduce pressure to zero.

(f) Apply 900 psi pressure to return port and displace input lever to extend position. Allow piston (45) to reach fully extended position, and hold at 900 psi for 60 seconds. Check that there is no external leakage or permanent set. Reduce pressure to zero.

(3) Low Pressure Proof Test

(a) Connect pressure and return ports to hydraulic pressure. Apply 5 psi to both ports simultaneously, and hold pressure for 1 minute.

(b) Reduce pressure to zero, and then repressurize both ports to 5 psi for 1 minute. Check that there is no external leakage.

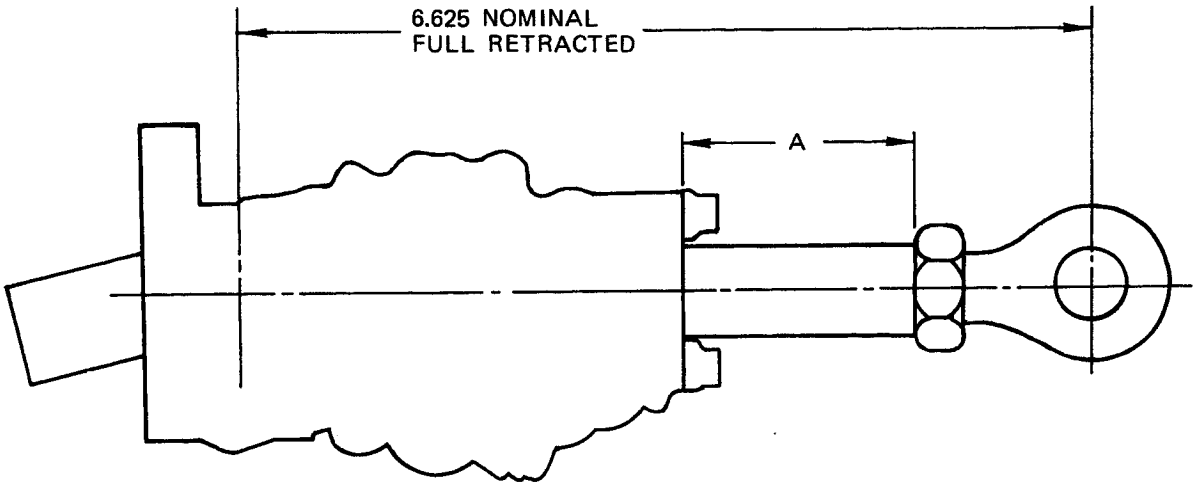
(4) Output Resolution - Lever Stroke

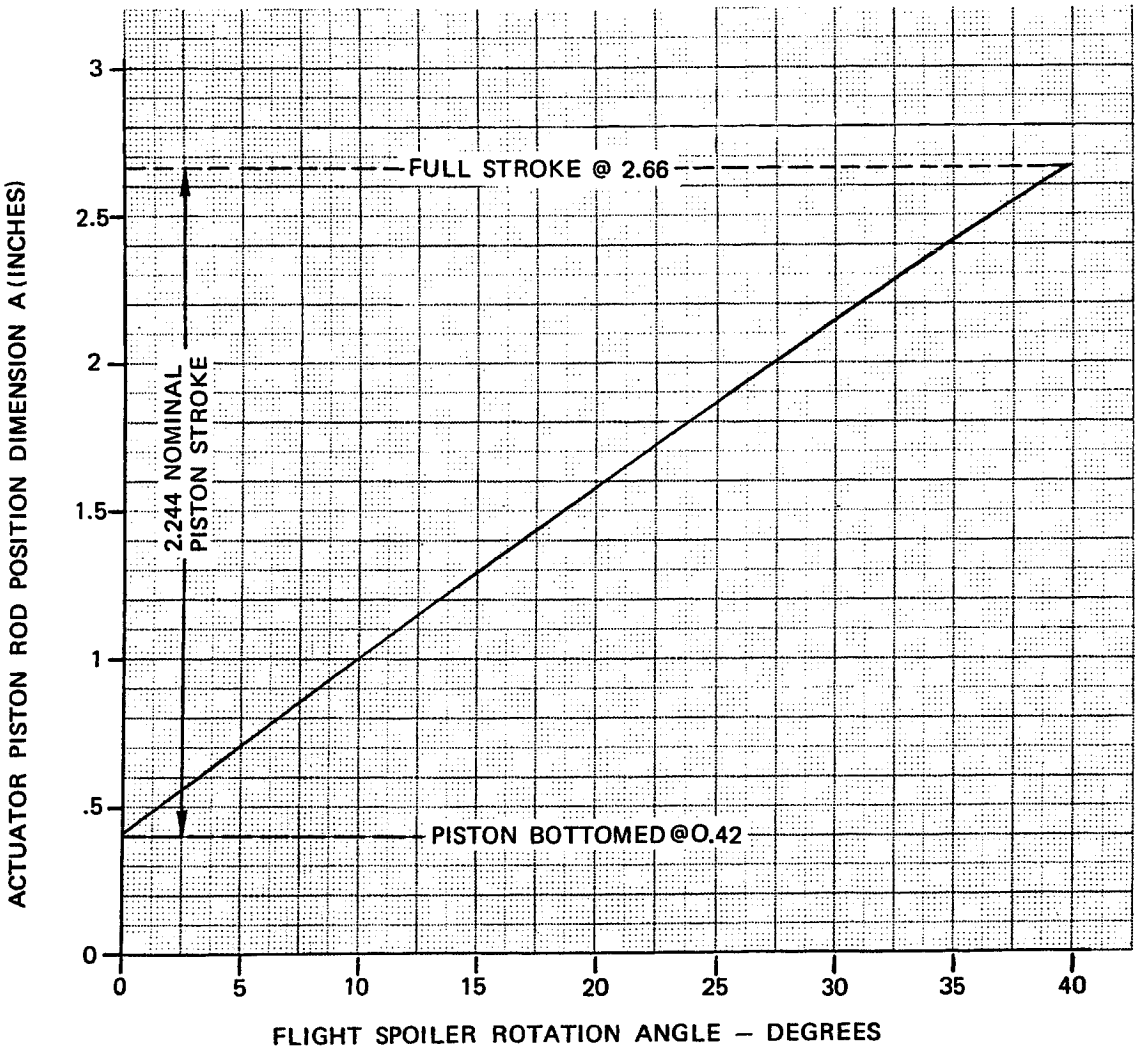
(a) Connect linear position transducer to measure test unit input lever rotation. Compare and match transducer readings with protractor indicated position.

(b) If rotary position transducer is used, connect transducer to output of unit to directly measure output rotation. If a linear transducer such as TX150804-3 is used, install transducer on actuator to measure output (piston rod position). To determine corresponding output panel rotation, see Fig. 711.

(c) Connect input position transducer to supply signal to X axis of an X-Y Recorder. Connect output position transducer to Y axis. Calibrate plotter to give readable trace.

(d) Apply 3000 psi to pressure port. Move input lever to full retract position.





Output Resolution - Rotation and Travel
Figure 711

(e) Cycle unit through one complete cycle by deflecting input lever from zero degrees to 3 degrees and back to zero degree of input lever rotation. Deflect lever slowly to achieve rate not exceeding 0.05 Hz. (See Fig. 712 for example trace.)

(f) Record input and output rotations simultaneously on X-Y recorder.

1) Check that difference in input lever position for any given output panel position does not exceed:

a) 0.10 degree on new or overhauled units

b) 0.50 degree on units in service

2) Check that difference in output panel position does not exceed 0.10 degree for any given input lever position.

a) 0.10 degree on new or overhauled units

b) 0.50 degree on units in service

(g) Repeat (4)(e) and (4)(f) by moving input lever from 12 degrees to 15 degrees and back to 12 degrees. Limits shall be the same.

(5) Snubbing Action (Not required for units in service)

(a) Make certain that PCU is completely bled of air.

(b) With no inlet pressure applied, manually stroke unit from fully extended to fully retracted through one complete cycle.

(c) Check that definite snubbing action occurs within 0.20 inch from the end of the piston stroke in retract direction. Check that piston moves out of fully retracted position without noticeable snubbing or restriction.

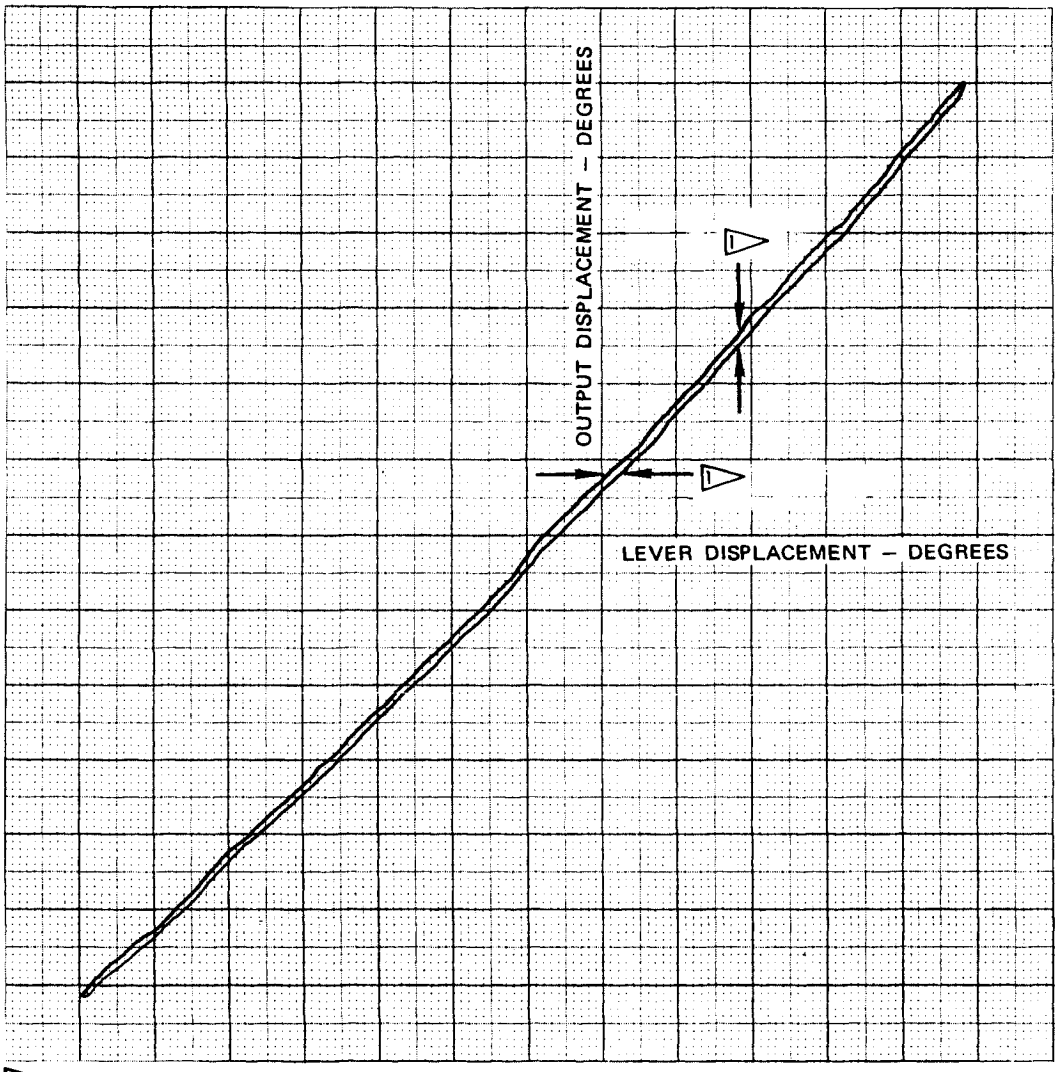
(6) Hold-Down Check Valve Leakage (Fig. 713)

(a) Apply 3000 psi to pressure port, move input lever to retract position and bottom piston (45). Reduce pressure to zero.

(b) Install unit in test fixture TX150820 and apply tension load of 4200-4600 pounds to piston rod. After an initial extension of 0.030 inch maximum, check that piston movement does not exceed an additional 0.05 inch during a 5 minute period.

OUTPUT RESOLUTION

0°–3°–0° PLOT SHOWN



1 NOT TO EXCEED:
A. 0.10 DEGREE ON NEW OR OVERHAULED UNITS
B. 0.50 DEGREE ON UNITS IN SERVICE

NOTES:

1. AMBIENT TEMPERATURE = 70°F
2. FLUID TEMPERATURE = 95°F
3. "X" AXIS: 1° = 2 INCHES
4. "Y" AXIS: 1° = 2 INCHES
5. LIMITS: THE ASCENDING TRACE SHALL NOT DEVIATE FROM THE DESCENDING TRACE BY MORE THAN 0.10 OR 0.50 DEGREES (SEE 1)

Output Resolution - Example Trace
Figure 712

(c) Reduce tension load to 2400 pounds, apply 3000 psi to pressure port and move input lever to position piston at 1.0 ±0.5-inch extension. Reduce the pressure from 3000 to 0 psi at uniform rate of approximately 500 psi per second and hold for 2 minutes. Maintain the 2400 pounds tension load. After an initial extension of 0.03 inch max, check that piston motion does not exceed an additional 0.02 inch during the 2 minutes.

(7) Dynamic Leakage Check (Fig. 713)

(a) Install unit in test fixture TX150820.

(b) DELETED

(c) Apply 3000 psi to inlet port.

(d) Cycle the PCU at a rate not exceeding 1 inch per second.

(e) Actuate the unit for 25 cycles. There shall be no chatter, instability or external leakage at any static seal.

(f) Check that leakage does not exceed one drop within number of cycles as follows:

1) New or overhauled units -- 25 cycles at piston rod seal (37); 100 cycles at rotary seals (10).

2) Units in service -- 5 cycles at piston rod seal (37); 25 cycles at rotary seals (10).

(8) Piston Stroke

(a) Install unit in test fixture TX150820

(b) Apply 3000 psi to the inlet port. Fully extend piston and check:

1) Piston travel is 2.224-2.264 inches

2) Input lever travel is approximately 36.5 degrees

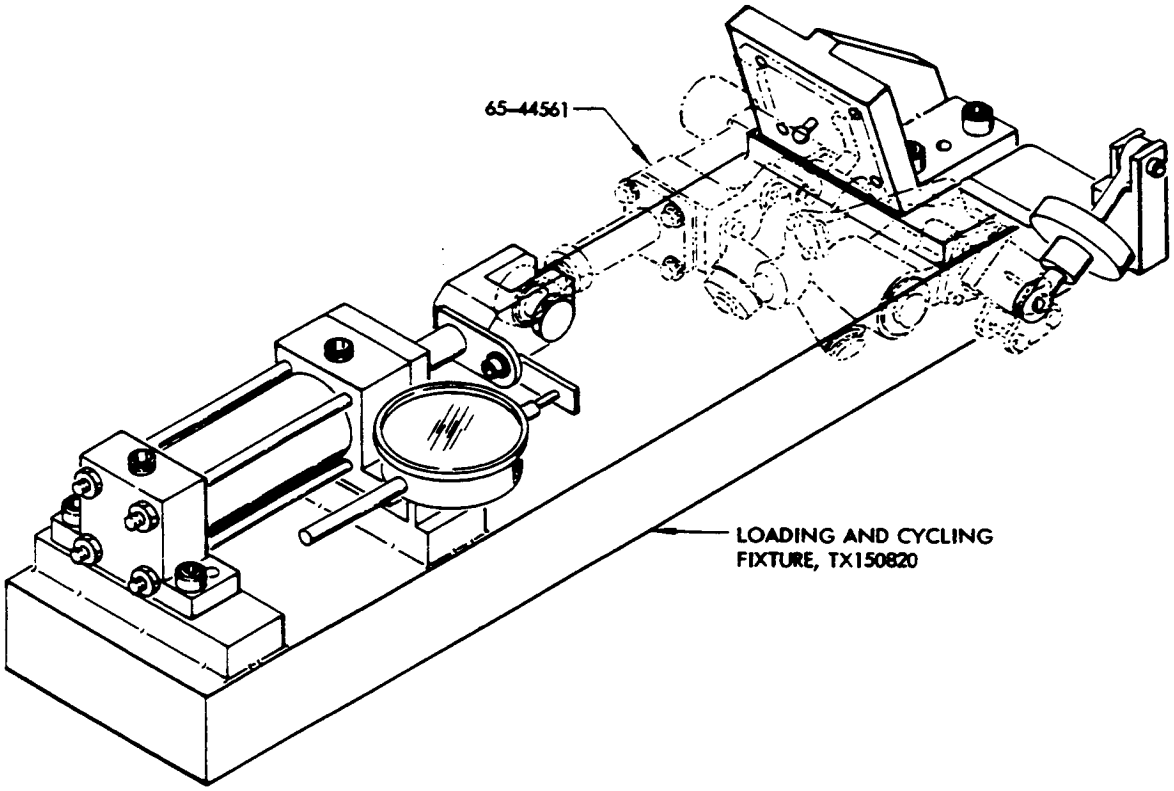
(c) With no pressure applied, slowly move input lever from zero position to full extend, back to zero, to full retract. Check that lever travel is minimum of 60 degrees each side of neutral.

(d) With 3000 psi applied check that the piston is retracted and input lever is free.

(9) Lever Force

(a) Disconnect rod end of PCU from fixture TX150820, permitting piston (45) to be free to move. Apply 3000-psi inlet pressure and 50-psi return pressure. Move input lever through one complete cycle, including overtravel. Check that force required to move lever does not exceed 275 lb-in.

(b) Apply zero inlet pressure, and move lever through one complete cycle. Check that force required to move input lever does not exceed 20 lb-in.



Hold-Down Check Valve Leakage, Dynamic Seal/Load,
Piston Stroke Test
Figure 713

TROUBLE SHOOTING

1. Trouble During Test After Overhaul (See figures 1101 and 1102.)

	Trouble	Possible Cause	Correction
A.	Gage balance out of limits	Slide and sleeve assembly defective (figure 1101, index number 100)	Replace slide and sleeve assembly
		Piston seal defective (figure 1101, index number 37)	Replace seal
		Blow-down check valve assembly leaking (figure 1101, index number 88)	Repair or replace valve or packings
B.	Pressure gain	Same as for gage balance	Same as for gage balance
C.	Excessive flow (near neutral or high neutral leakage)	Slide and sleeve assembly defective (figure 1101, index number 100)	Replace slide and sleeve assembly
D.	Flow low at large stroke	Flow passage blocked	Clean flow passage; check for fluid contamination
		Filter plugged (figure 1101, index number 94)	Replace filter
E.	Excessive binding	Misalignment of parts	Replace parts
		Scored or burred parts	Repair or replace parts
F.	External leakage	Defective packings	Replace preformed packings

Trouble	Possible Cause	Correction
G. Excessive valve force	Slide and sleeve assembly defective (figure 1101, index number 100)	Replace slide and sleeve assembly
	Scored or burred parts in linkage	Repair or replace
H. Excessive output resolution	Worn input linkage	Replace defective input linkage
J. Excessive internal leakage		
With PCU input lever in neutral	Worn overtravel piston seals (82, 84, figure 1101) *[1]	Replace worn seals
	Defective thermostat valve or defective plug or valve static seal *[1]	Replace defective valve or seal
	Excessive control valve slide-to-seal bore clearance *[1]	Replace or rework slide or sleeve
	Defective valve sleeve static seals *[1]	Replace defective seals
	Worn or eroded condition of slide land positioned over sleeve port	Replace or rework slide or sleeve

*[1] Excessive leakage caused by any one of these items may not be detected because of high leakage allowed for the fifth item at the neutral position. However, leakage caused by these items would be detectable at the extreme travel checks.

With PCU input lever in either extreme travel position	Leakage can be due to any of first four items above	Same as for respective condition above
	Defective blow-down check valve or defective check valve static seal (retract position only) *[2]	Replace defective check valve or static seal

Trouble	Possible Cause	Correction
With PCU input lever in either extreme travel position (Cont)	Defective relief check valve or defective check valve static seal (extend position only) *[2]	Replace defective check valve or static seal
	Defective extension check/thermal relief valve static seal (extend position only) *[2]	Replace defective static seals

*[2] Excessive leakage caused by any one of these items may not be detected due to equalization of pressure across the component during neutral position check, or during extreme travel check opposite to that indicated.

K.	Loss of snubbing	Worn parts	Replace worn parts
		Defective snubber check valve (figure 1101, index numbers 38 thru 41)	Repair or replace
L.	Excessive snubbing (as piston moves away from retract position)	Snubbing check valve stuck open (figure 1101, index numbers 38 thru 41)	Repair or replace
M.	Excessive force	Binding parts	Repair or replace
N.	Excessive cylinder pressure (during external load feedback)	Slide and sleeve assembly defective (figure 1101, index numbers 100)	Replace slide and sleeve assembly
O.	Deleted		
P.	Unit creeps under load	Thermal relief valve leaks (figure 1101, index number 62 thru 74)	Repair or replace
		Thermal relief valve cracking pressure low	Repair or replace
		Defective piston seal (figure 1101, index number 37)	Replace seal
		Defective rod seals	Replace seals

	Trouble	Possible Cause	Correction
Q.	Check valve (88) has low flow	Valve sticks closed	Replace check valve assembly
R.	Check valve (88) pressure setting out of limits	Defective springs	Replace check valve assembly
S.	Thermal relief valve pressure setting out of limits	Improper shimming (figure 1101, index number 70)	Re-shim
T.	Blow-down check	Defective spring	Replace check valve assembly
U.	Blow-down check	Sticking poppet inside check valve assembly (88)	Replace check valve assembly

STORAGE INSTRUCTIONS

1. At the completion of functional test, the unit shall be returned to the retracted position and shall remain in the retracted position.

2. After testing fill the unit with hydraulic fluid, BMS 3-11. If Skydrol 7000 was used for testing, the unit must be thoroughly drained and flushed with BMS 3-11 before filling.

3. Cap or plug the ports with MS21914 caps or plugs with suitable Skydrol resistant gaskets.

4. Wrap entire assembly in vapor barrier paper for storage.

5. Tag or mark with test date.

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

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

NOTE: Equivalent substitutes may be used for listed items. See Testing for details of interchangeability of the following tools.

F80224-60 -- Test Fixture Assembly (Supercedes F80224-1, -58)

TX10967-4 -- Piezometer *[1]

TX10967-6 -- Piezometer *[1]

TX150796 -- Flow Curve Test Fixture *[1]

TX150804 -- Positional Accuracy Fixture *[1]

TX150806 -- Dummy Check Valve and Port *[1]

TX150809 -- Packing Install Sleeve and Seat *[1]

TX150811 -- Packing Install Sleeve *[1]

TX150817 -- Lockwire Fixture *[1]

TX150820 -- Load and Cycle Fixture *[1]

TX150821 -- Setting and Checking Fixture *[1]

TX151029 -- Slide and Sleeve Installation Tool *[1]

TX151031 -- Packing Install Sleeve *[1]

TX151034 -- Shim Installation Tool *[1]

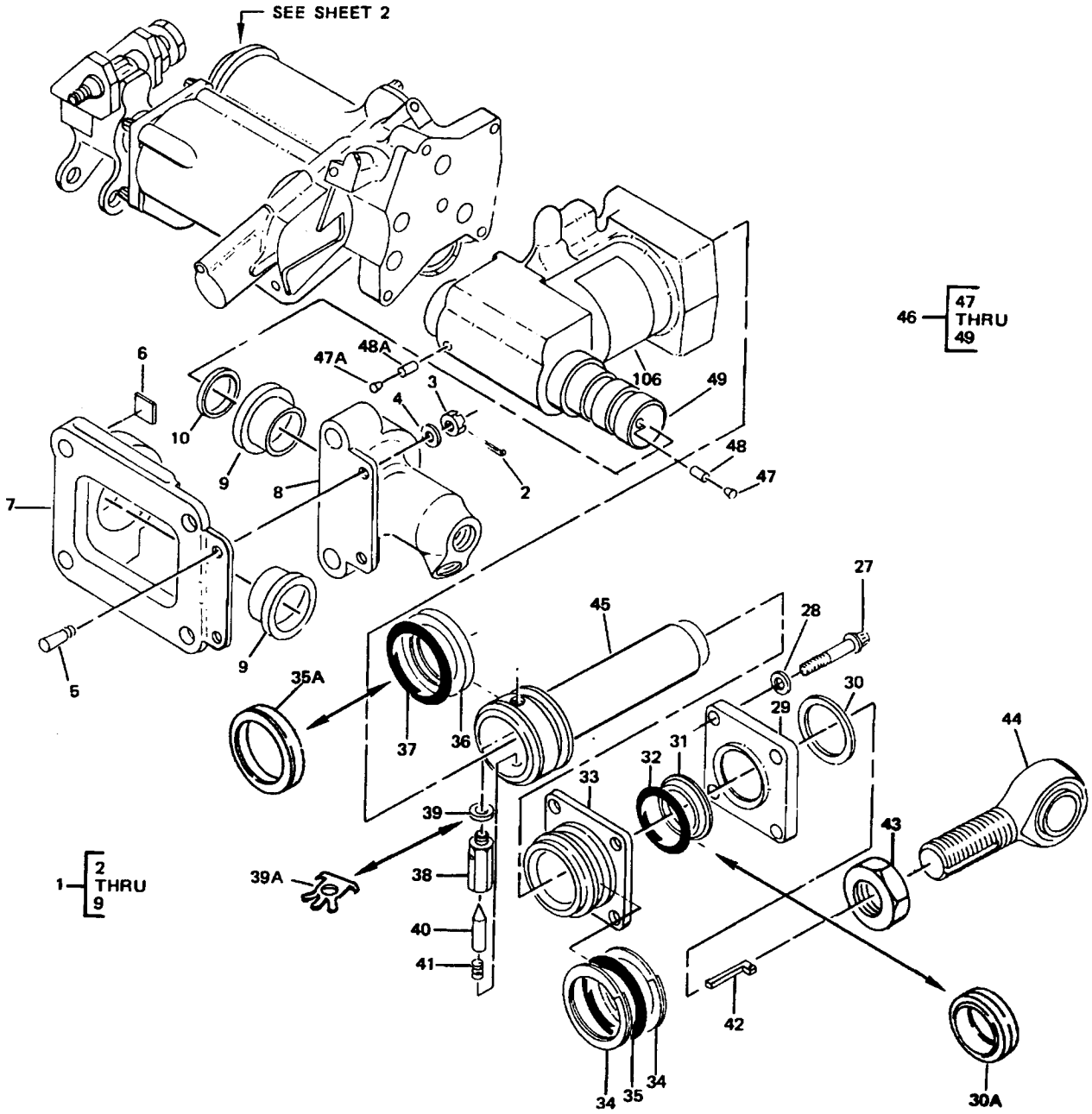
9652 -- Blowout Tool *[2]

*[1] Hydraulic Units Inc., Sub of Boeing Co., (These tools, formerly manufactured by Weston Hydraulics, are no longer available)

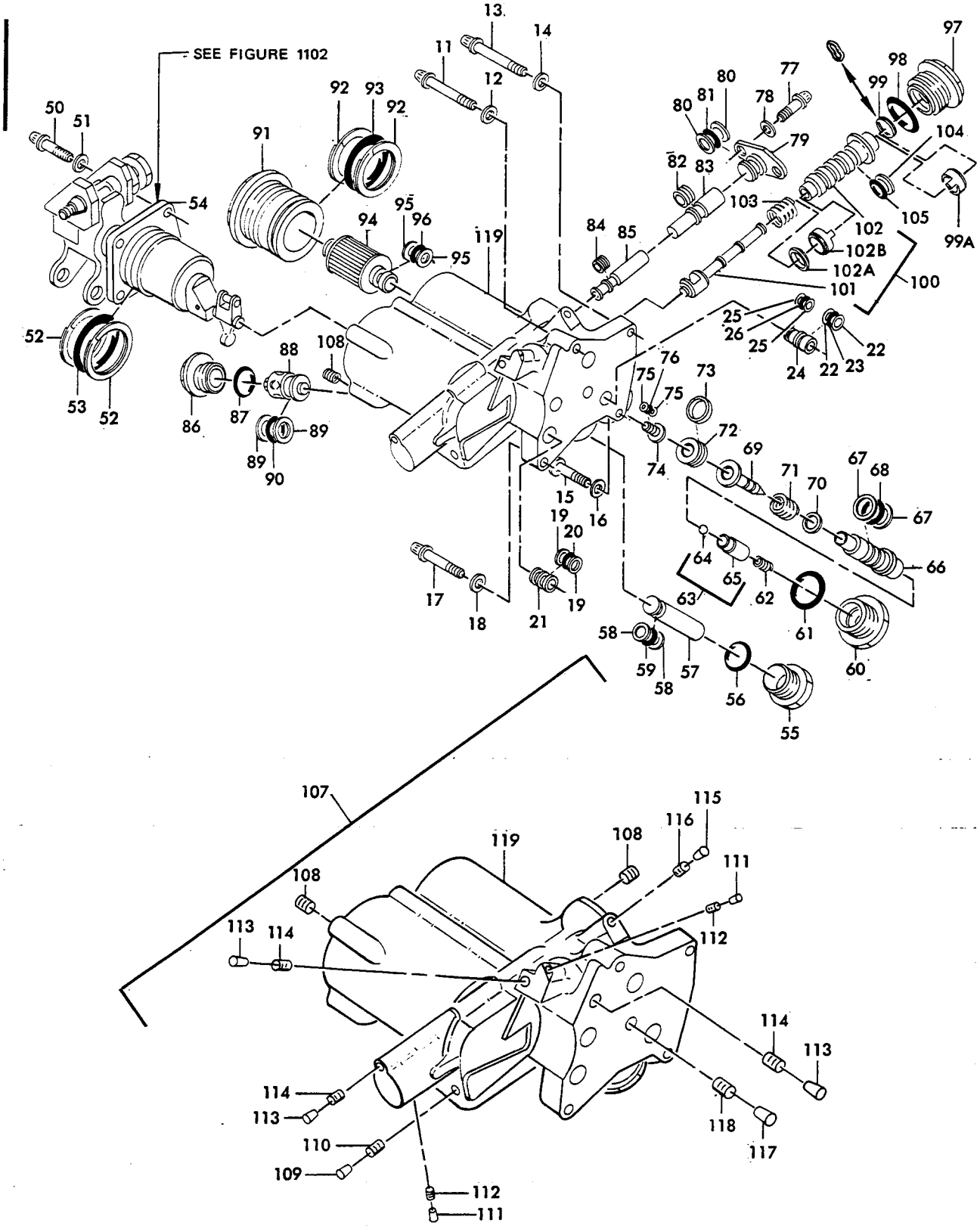
*[2] Dowty Aerospace Co.

NOTE: Test Equipment F80224-60 replaces fixtures TX10967-4, -6 (piezometer), TX150796 (flow curve test), TX150804 (positional accuracy), TX150806 (dummy check valve and port), TX150820 (loading and cycling), and TX150821 (setting and checking) which are used in Test Procedure No. 2.

ILLUSTRATED PARTS LIST



Flight Spoiler Power Control Unit Assembly
Figure 1101 (Sheet 1)



Flight Spoiler Power Control Unit Assembly
Figure 1101 (Sheet 2)

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-	65-44561-5		FLIGHT SPOILER PWR CONTROL UNIT ASSY (SB 27-1020)	A	RF
	65-44561-6		FLIGHT SPOILER PWR CONTROL UNIT ASSY (SB 27-1020)	B	RF
	65-44561-7		FLIGHT SPOILER PWR CONTROL UNIT ASSY (SB 27-1020)	C	RF
	65-44561-8		FLIGHT SPOILER PWR CONTROL UNIT ASSY	D	RF
	65-44561-9		FLIGHT SPOILER PWR CONTROL UNIT ASSY	E	RF
	65-44561-10		FLIGHT SPOILER PWR CONTROL UNIT ASSY (SB 27-1020)	F	RF
	65-44561-11		FLIGHT SPOILER PWR CONTROL UNIT ASSY	G	RF
	65-44561-12		FLIGHT SPOILER PWR CONTROL UNIT ASSY	H	RF
	65-44561-13		FLIGHT SPOILER PWR CONTROL UNIT ASSY	I	RF
	65-44561-14		FLIGHT SPOILER PWR CONTROL UNIT ASSY (SB 27-1112R1)	J	RF
	65-44561-15		FLIGHT SPOILER PWR CONTROL UNIT ASSY	K	RF
1	69-35697-4		. BRACKET ASSY, MOUNTING	A-FH	1
1	69-35697-6		. BRACKET ASSY, MOUNTING	GIJK	1
2	MS24665-152		. . PIN, COTTER		2
3	MS17825-4		. . NUT		2
4	AN960-416		. . WASHER		2
5	69-35696-1		. . PIN, TAPERED		2
6	66-22710-1		. . SHIM		1
7	69-35697-2		. . BRACKET (MATCHED WITH 69-35697-5)	A-FH	1
7	69-35697-7		. . BRACKET (MATCHED WITH 69-35697-5)	GIJK	1
8	69-35697-3		DELETED		
8	69-35697-5		. . JOURNAL (MATCHED WITH 69-35697-2, -7)		1
9	NHLF20-207A		. . BUSHING, V15860 (BOEING 10-60516-244)		2
9	FBR20A17BAC		. . BUSHING, V73134 (BOEING 10-60516-244)		2
9	FBE20A17BAC		. . BUSHING, V73134 (BOEING 10-60516-244)		2
9	90560		. . BUSHING, V09455 (BOEING 10-60516-244)		2
9	FBJW40TF46-17		. . BUSHING, V21335 (BOEING 10-60516-244)		2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
9	AJF20A109		. . BUSHING, V50294 (BOEING 10-60516-244)		2
9	YTS570		. . BUSHING, V77896 (BOEING 10-60516-244)		2
9	DBAF20-077		. . BUSHING, V81376 (BOEING 10-60516-244)		2
9	KJN20-12		. . BUSHING, V97613 (BOEING 10-60516-244)		2
10	S11940-213H5		. SEAL, PLUS, V97820		3
10	S30775-213H5		. SEAL, PLUS, V97820 (OPT)		3
10	S30855-213H5N		. SEAL, PLUS, V97820 (OPT)		3
11	NAS1351N4H28P		. SCREW, CAP (REPLD BY BACS12HL4AH28P)		1
11	NAS1351-4H28P		. SCREW, CAP (OPT) (REPLD BY BACS12HL4H28P)		1
11	BCS12HL4AH28P		. SCREW, CAP (REPLS NAS1351N4H28P)		1
11	BCS12HL4H28P		. SCREW, CAP (OPT) (REPLS NAS1351-4H28P)		1
12	66-22781-1		. WASHER		1
13	NAS1351N4H14P		. SCREW, CAP (REPLD BY BACS12HL4AH14P)		1
13	NAS1351-4H14P		. SCREW, CAP (OPT) (REPLD BY BACS12HL4H14P)		1
13	BACS12HL4AH 14P		. SCREW, CAP (REPLS NAS1351N4H14P)		1
13	BACS12HL4H14P		. SCREW, CAP (OPT) (REPLS NAS1351-4H14P)		1
14	66-22781-1		. WASHER		1
15	NAS1351N4H10P		. SCREW, CAP (REPLD BY BACS12HL4AH10P)		1
15	NAS1351-4H10P		. SCREW, CAP (OPT) (REPLD BY BACS12HL4H10P)		1
15	BACS12HL4AH 10P		. SCREW, CAP (REPLS NAS1351N4H10P)		1
15	BACS12HL4H10P		. SCREW, CAP (OPT) (REPLS NAS1351-4H10P)		1
16	66-22781-1		. WASHER		1
17	NAS1351N4H14P		. SCREW, CAP (REPLS BY BACS12HL4AH14P)		1
17	NAS1351-4H14P		. SCREW, CAP (OPT) (REPLS BY BACS12HL4H10P)		1
17	BACS12HL4AH 14P		. SCREW, CAP (REPLS NAS1351N4H10P)		1
17	BACS12HL4H14P		. SCREW, CAP (OPT) (REPLS NAS1351-4H14P)		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
18	66-22781-1		. WASHER		1
19	BACR12BM011		. RING, BACKUP		12
19	MS28782-6		. RING, BACKUP (OPT)		12
20	NAS1611-011		. PACKING, O-RING		6
21	66-22772-1		. TUBE, TRANSFER		3
22	BACR12BM011		. RING, BACKUP		2
22	MS28782-6		. RING, BACKUP (OPT)		2
23	NAS1611-011		. PACKING, O-RING		1
24	69-35888-1		. TUBE, TRANSFER		1
25	BACR12BM009		. RING, BACKUP		2
25	MS28782-4		. RING, BACKUP (OPT)		2
26	NAS1611-009		. PACKING, O-RING		1
27	BACB30CW5H4		. BOLT	A-J	4
27	BACB30US5K6H		. BOLT (OPT)	A-J	4
27	BACB30US5K6H		. BOLT	K	4
27	BACB30US5K4H		. BOLT (OPT)	K	4
28	MS20002C5		. WASHER		4
29	69-35558-1		. RETAINER, SEAL		1
30	BACS34A10A		. SCRAPER		1
30A	GTC5394C215		. SEAL ASSY, V5F573 *[2] (USED WITH 69-35549-1, ITEM 33)		1
31	BACS11AA215A		. SEAL, FOOT *[2] (USED WITH 69-35549-2, ITEM 33)		1
31	S12095-215-5		. SEAL, FOOT, V97820 (OPT) *[2] (USED WITH 69-35549-2, ITEM 33)		1
31	S33121-215-99		. SEAL, FOOT, V97820 (OPT) *[2] (USED WITH 69-35549-2, ITEM 33)		1
32	NAS1611-215		. PACKING, O-RING *[2] (USED WITH 69-35549-2, ITEM 33)		1
33	69-35549-1		. BEARING, END	A-E	1
33	69-33549-2		. BEARING, END (OPT)	A-E	1
33	69-35549-2		. BEARING, END	F-K	1
34	BACR12BM223		. RING, BACKUP		2
34	MS28783-1		. RING, BACKUP (OPT)		2
35	NAS1611-223		. PACKING, O-RING		1
35A	7222MT952T		. RING, CAP V5F573 *[3]		1
36	69-54540-222		. RING, CAP *[3]		1
37	NAS1611-222		. PACKING, O-RING *[3]		1
38	66-22714-1		. SEAT		1
39	66-22807-1		. WASHER (OPT TO 69-74726-1) *[1]	A-J	1
39A	69-74726-1		. LOCKWASHER *[1]	A-J	1
39A	69-74726-1		. LOCKWASHER	K	1
39A	33283		. LOCKWASHER, V82106 (OPT)		1
40	66-22715-1		. POPPET		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
41	66-22717-1		. SPRING		1
42	66-22782-1		. KEY		1
43	NAS509-12		. NUT, JAM	AB	1
43	NAS1423-12		. NUT, JAM	C-K	1
44	ART12E103		. ROD END BEARING, V50294 (BOEING 10-60779-175)	A	1
44	KBDE12-13		. ROD END BEARING, V97613 (BOEING 10-60779-175)	A	1
44	MSSKR1212-28 BAE		. ROD END BEARING, V73134 (BOEING 10-60779-175)	A	1
44	NHNE12-204		. ROD END BEARING, V15860 (BOEING 10-60779-175)	A	1
44	REMS24ATC24-3		. ROD END BEARING, V21335 (BOEING 10-60779-175)	A	1
44	YTM182		. ROD END BEARING, V77896 (BOEING 10-60779-175)	A	1
44	177168		. ROD END BEARING, V09455 (BOEING 10-60779-175)	A	1
44	ART12E104		. ROD END BEARING, V50294 (BOEING 10-60779-182)	B-K	1
44	DREM12-131		. ROD END BEARING, V81376 (BOEING 10-60779-182)	B-K	1
44	KBDE12-16		. ROD END BEARING, V97613 (BOEING 10-60779-182)	B-K	1
44	MSSKR1212-28 BAD		. ROD END BEARING, V73134 (BOEING 10-60779-182)	B-K	1
44	NHNE12-205		. ROD END BEARING, V15860 (BOEING 10-60779-182)	B-K	1
44	YTM212		. ROD END BEARING, V77896 (BOEING 10-60779-182)	B-K	1
44	177275		. ROD END BEARING, V09455 (BOEING 10-60779-182)	B-K	1
44	ADNE12-205		. ROD END BEARING, V15860 (BOEING 10-60779-182A)	B-K	1
45	65-44569-2		. PISTON, V60029, V79294		1
45	65-44569-1		. PISTON, V60029, V79294 (OPT)		1
46	65-44562-1		. BARREL ASSY		1
46	65-44562-3		DELETED		
47	BACP20AX18P		. . PIN		2
47A	BACP20AX18P		. . PIN		2
47A	BACP20AX18AP		. . PIN (OPT)		2
48	BACP20AX18		. . PLUG		2
48A	BACP20AX18		. . PLUG		2
48A	BACP20AX18A		. . PLUG (OPT)		2
49	65-44562-2		. . BARREL		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
50	NAS1351N4H10P		. SCREW, CAP (REPLD BY BACS12HL4AH10P)		4
50	NAS1351-4H10P		. SCREW, CAP (OPT) (REPLD BY BACS12HL4H10P)		4
50	BACS12HL4AH 10P		. SCREW, CAP (REPLS NAS1351N4H10P)		4
50	BACS12HL4H10P		. SCREW, CAP (OPT) (REPLS NAS1351-4H10P)		4
51	AN960PD416		. WASHER		4
52	MS28782-25		. RETAINER		2
53	NAS1611-220		. PACKING, O-RING		1
54	69-35638-4		. INPUT ASSY (FIG. 1102) (PRE SB 27-1112)	AB	1
54	69-35638-5		. INPUT ASSY (FIG. 1102) (PRE SB 27-1112)	C-G	1
54	69-35638-6		. INPUT ASSY (FIG. 1102) (PRE SB 27-1112)	HI	1
54	69-35638-7		. INPUT ASSY (FIG. 1102) (POST SB 27-1112)	A-I	1
54	69-35638-7		. INPUT ASSY (FIG. 1102)	JK	1
55	66-22773-1		. CAP	ABCE	1
56	NAS1612-10		. PACKING, O-RING	ABCE	1
57	69-54599-1		. PLUG, FLOW CONTROL	ABCE	1
57	2720-0		. VALVE, THERMOSTAT, V93835 (BOEING 10-60809-1)(OPT)	ABCE	1
57	59800-5001		. VALVE, THERMOSTAT, V82106 (BOEING 10-60809-1)(OPT)	ABCE	1
58	BACR12BM012		. RING, BACKUP	ABCE	2
58	MS28782-7		. RING, BACKUP (OPT)	ABCE	2
59	NAS1611-012		. PACKING, O-RING	ABCE	1
60	69-35541-3		. CAP (REPLS 69-35541-1,-2)		1
60	69-35541-2		. CAP (REPLS 69-35541-1) (REPL BY 69-35541-3)		1
60	69-35541-1		. CAP (REPL BY 69-35541-2,-3)		1
61	NAS1612-12		. PACKING, O-RING		1
62	66-22720-1		. SPRING		1
63	69-35903-1		. POPPET ASSY		1
64	MS150457		. . BALL		1
65	69-35903-2		. . POPPET		1
66	65-44762-1		. SLEEVE		1
67	BACR12BM113		. RING, BACKUP		2
67	MS28782-11		. RING, BACKUP (OPT)		2
68	NAS1611-113		. PACKING, O-RING		1
69	69-35954-1		. PLUNGER, THERMAL RELIEF		1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
70	17117		. SHIM, V79294		1
70	69-54670-1		. SHIM (OPT)		1
71	66-22719-1		. SPRING		1
72	69-35955-1		. PISTON, THERMAL RELIEF		1
73	S12003-113-6		. RING, PISTON, V97820		1
74	69-35953-1		. PISTON, THERMAL RELIEF		1
75	BACR12BM006		. RING, BACKUP		2
75	MS28782-1		. RING,BACKUP (OPT)		2
76	NAS1611-006		. PACKING, O-RING		1
77	NAS1351N4H10P		. SCREW, CAP (REPLD BY BACS12HL4AH10P)		2
77	NAS1351-4H10P		. SCREW, CAP (OPT) (REPLD BY BACS12HL4H10P)		2
77	BACS12HL4AH 10P		. SCREW, CAP (REPLS NAS1351N4H10P)		2
77	BACS12HL4H10P		. SCREW, CAP (OPT) (REPLS NAS1351-4H10P)		2
78	AN960PD416		. WASHER		2
79	69-35597-1		. CAP, OVERTRAVEL		1
80	BACR12BM110		. RING, BACKUP		2
80	MS28782-8		. RING, BACKUP (OPT)		2
81	NAS1611-110		. PACKING, O-RING		1
82	S12003-12-6		. RING, PISTON, V97820		1
83	69-35592-2		. PISTON, OVERTRAVEL		1
84	S12003-10-6		. RING, PISTON, V97820		1
85	69-35591-2		. PISTON, OVERTRAVEL		1
86	66-22774-1		. CAP, CHECK VALVE (REPL BY 66-22774-2)		2
86	66-22774-2		. CAP, CHECK VALVE (REPLS 66-22774-1)		2
87	NAS1612-10		. PACKING, O-RING		2
88	62000-5003		. VALVE, CHECK, V92003 (BOEING 10-60503-4)		2
89	BACR12BM113		. RING, BACKUP		4
89	MS28782-11		. RING, BACKUP (OPT)		4
90	NAS1611-113		. PACKING, O-RING		2
91	69-35559-1		. CAP, FILTER		1
92	BACR12BM217		. RING, BACKUP		2
92	MS28782-22		. RING, BACKUP (OPT)		2
93	NAS1611-217		. PACKING, O-RING		1
94	AC4638E1		. FILTER, V01414 (BOEING 10-60808-1)		1
94	7500271		. FILTER, V05228 (BOEING 10-60808-1)		1
94	4245-501		. FILTER, V21550 (BOEING 10-60808-1)		1
94	21-11175		. FILTER, V81873 (BOEING 10-60808-1)		1
94	21-10034		. FILTER, V81873 (BOEING 10-60808-1)		1

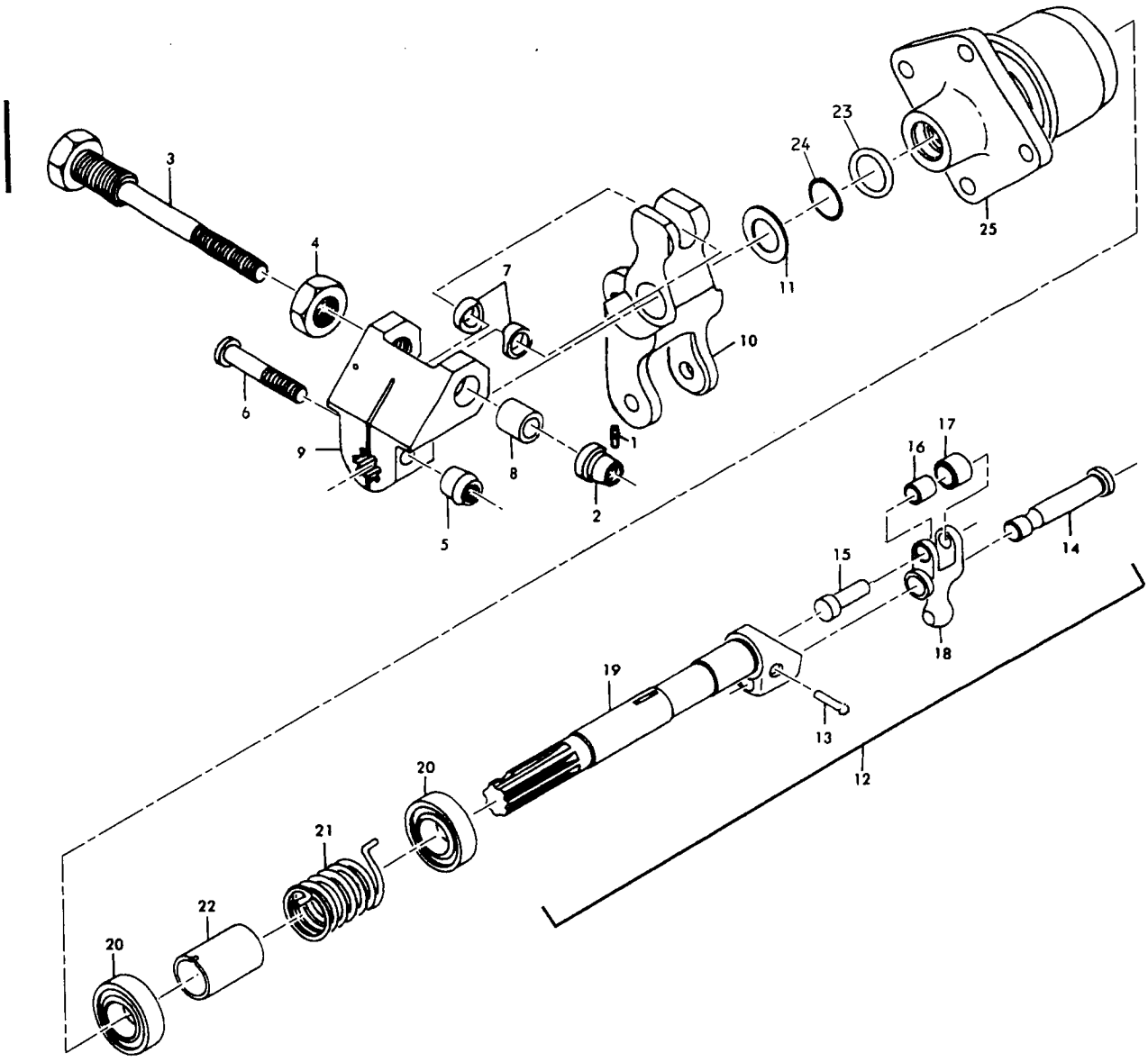
FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
94	AC4638E11		. FILTER, V01414 (BOEING 10-60808-3) (OPT)		1
94	7500271		. FILTER, V05228 (BOEING 10-60808-3) (OPT)		1
94	4245-501		. FILTER, V21550 (BOEING 10-60808-3) (OPT)		1
94	21-11175		. FILTER, V81873 (BOEING 10-60808-3) (OPT)		1
95	BACR12BM012		. RING, BACKUP		2
95	MS28782-7		. RING, BACKUP (OPT)		2
96	NAS1611-012		. PACKING, O-RING		1
97	69-35939-1		. CAP, CONTROL VALVE		1
98	NAS1612-10		. PACKING, O-RING (SB 27-1020)		1
99	1151-103		. WASHER, SPRING, V60029 (REPLS 1001PB0750)(SB 27-1020)	A-E	1
99	1151-103		. WASHER, SPRING, V94641	F-I	1
99	69-54788-1		. WASHER, SPRING (OPT)	F-I	1
99	69-54788-1		. WASHER, SPRING	JK	1
99A	69-54659-2		. COLLAR (SB 27-1020)		1
100	66-22743-1		. SLIDE AND SLEEVE ASSY (MATCHED SET)	ABC	1
100	66-22743-2		. SLIDE AND SLEEVE ASSY (MATCHED SET) (SB 27-1020)	ABC	1
100	66-22743-2		. SLIDE AND SLEEVE ASSY (MATCHED SET)	DE	1
100	66-22743-3		. SLIDE AND SLEEVE ASSY (MATCHED SET)	F-I	1
100	66-22743-4		. SLIDE AND SLEEVE ASSY (MATCHED SET) (SB 27-1112R.1)	A-I	1
100	66-22743-4		. SLIDE AND SLEEVE ASSY (MATCHED SET)	JK	1
101	69-35547-1		. . SLIDE (USED ON 66-22743-1,-2,-3)		1
101	69-35547-2		. . SLIDE (USED ON 66-22743-4)		1
102	69-35546-1		. . SLEEVE (USED ON 66-22743-1)		1
102	69-35546-2		. . SLEEVE (USED ON 66-22743-2,-3,-4)		1
102A	69-54660-1		. . RING, LOCKING (USED ON 66-22743-2) (SB 27-1020)		1
102A	69-54660-2		. . RING, LOCKING (USED ON 66-22743-3,-4)		1
102B	69-54659-1		. . COLLAR (USED ON 66-22743-2) (SB 27-1020)		1
102B	69-54659-1		. . COLLAR (USED ON 66-22743-3,-4)		1
103	66-22746-1		. SPRING		1
104	MS28774-015		. RETAINER (SB 27-1020)		4

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
105	NAS1611-015		. PACKING, O-RING (SB 27-1020)		4
106	BACN12A3MN		. NAMEPLATE		1
106	BAC27DHY11		. NAMEPLATE (OPT)		1
107	65-44565-3		. MANIFOLD ASSY	ABCE	1
107	65-44565-4		. MANIFOLD ASSY	DFG	1
107	65-44565-6		. MANIFOLD ASSY	H-K	1
108	MS21209F4-15		. . INSERT		6
109	BACP20AX18DP		. . PIN		1
110	BACP20AX18D		. . PLUG		1
111	BACP20AX06DAP		. . PIN		2
112	BACP20AX06DA		. . PLUG		2
113	BACP20AX12DP		. . PIN (USED ON 65-44565-3)		2
113	BACP20AX12DP		. . PIN (USED ON 65-44565-4, -6)		3
114	BACP20AX12D		. . PLUG (USED ON 65-44565-3)		2
114	BACP20AX12D		. . PLUG (USED ON 65-44565-4,-6)		3
115	BACP20AX18DAP		. . PIN		1
116	BACP20AX18DA		. . PLUG		1
117	BACP20AX25DP		. . PIN		1
118	BACP20AX25D		. . PLUG		1
119	65-44565-2		. . MANIFOLD (USED ON 65-44565-3)		1
119	65-44565-5		. . MANIFOLD (USED ON 65-44565-4,-6)		1

*[1] WASHER 66-22807-1 USED WITH LOCKWIRE MS20995NC32 OPTIONAL TO LOCKWASHER 69-74726-1.

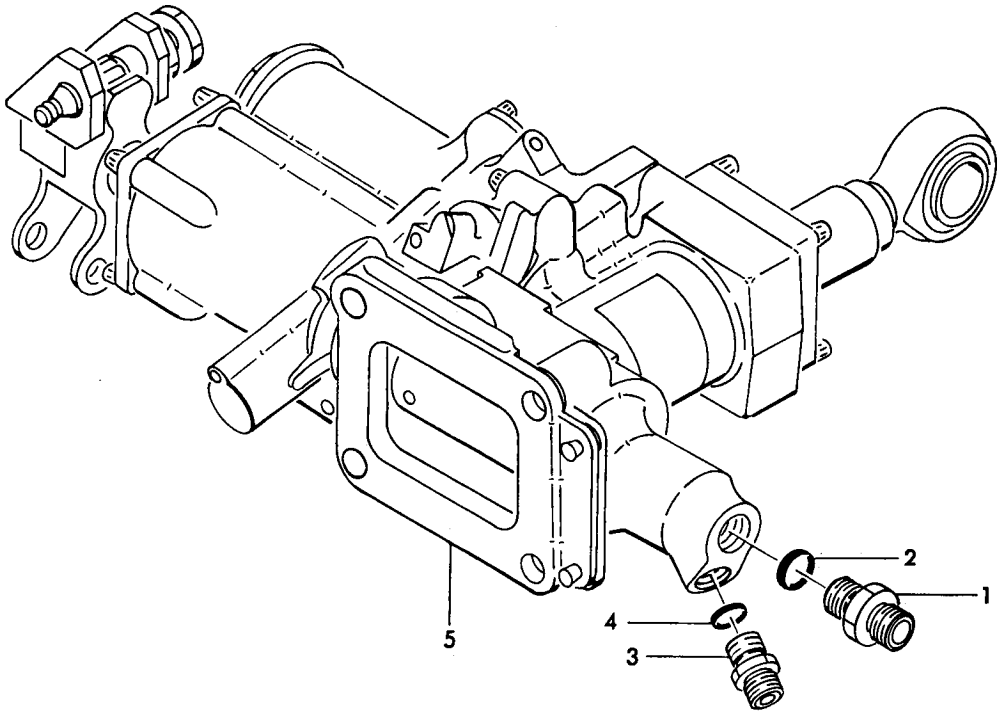
*[2] SEAL ASSY GTC5394C215 CAN BE USED ONLY ON THE 69-35549-1 END BEARING. ON THE 69-35549-2 END BEARING, FOOT SEAL S12095-215-5 PLUS O-RING NAS1611-215 IS OPTIONAL TO FOOT SEAL BACS11AA215A PLUS O-RING NAS1611-215, OR FOOT SEAL S33121-215-99 PLUS O-RING NAS1611-215.

*[3] CAP RING 69-54540-222 USED WITH PACKING NAS1611-222 OPTIONAL TO CAP RING 7222MT952T.



Spoiler Actuator Input Assembly
Figure 1102

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1102-					
	69-35638-4		INPUT ASSY, SPOILER ACTUATOR (FIG. 1101, ITEM 54) (PRE SB 27-1112)	A	RF
	69-35638-5		INPUT ASSY, SPOILER ACTUATOR (FIG. 1101, ITEM 54) (PRE SB 27-1112)	B	RF
	69-35638-6		INPUT ASSY, SPOILER ACTUATOR (FIG. 1101, ITEM 54) (PRE SB 27-1112)	C	RF
	69-35638-7		INPUT ASSY, SPOILER ACTUATOR (FIG. 1101, ITEM 54) (POST SB 27-1112)	D	RF
1	MS51923-197		. PIN (USED WITH BACC30M8, 69-35973-1)		1
2	69-35904-3		. COLLAR (USED WITH 69-35904-1)		1
2	BACC30M8		. COLLAR (USED WITH 69-35973-1)		1
3	69-35973-1		. SCREW (USED WITH BACC30M8, MS51923-197)		1
3	69-35904-1		. SCREW (USED WITH 69-35904-3)(OPT)		1
4	NAS509-8		. NUT	A	1
4	NAS1423-8		. NUT	BCD	1
5	NAS1080E8		. COLLAR		1
6	BACB30GW8-16		. BOLT		1
7	66-22748-1		. BUSHING		2
8	66-22740-1		. SPACER		1
9	69-35526-1		. FORK		1
10	65-44573-2		. LEVER		1
10	65-44573-1		. LEVER (OPT)	AB	1
10	65-44573-3		DELETED		
11	66-22741-1		. WASHER		1
12	66-22775-2		. SHAFT ASSY	ABC	1
12	66-22775-3		. SHAFT ASSY (OPT)	ABC	1
12	66-22775-4		. SHAFT ASSY (SB 27-1112R1)	ABC	1
12	66-22775-4		. SHAFT ASSY	D	1
13	MS20613-2C8		. . RIVET		1
14	66-22745-1		. . PIN		1
15	66-22783-1		. . PIN, ROLLER		1
16	66-22739-2		. . SPACER (USED ON 66-22775-2)		1
17	66-22742-2		. . ROLLER (USED ON 66-22775-2)		1
17	66-22742-3		. . ROLLER (USED ON 66-22775-3,-4)		1
18	69-35590-2		. . LEVER (USED ON 66-22775-2,-3)		1
18	69-35590-3		. . LEVER (USED ON 66-22775-4)		1
19	69-35593-1		. . SHAFT		1
20	69-35638-3		. BEARING, BALL		2
21	69-35589-2		. SPRING		1
22	66-22744-2		. SPACER, BEARING		1
23	BACR12BD112NA		. RING, CAP		1
24	NAS1611-112		. PACKING		1
25	69-35595-1		. COVER		1
25	69-35595-2		. COVER (OPT)		1



Flight Spoiler Power Control Unit Actuator Assembly
Figure 1103

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1103-					
	65-49580-11		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	A	RF
	65-49580-12		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	B	RF
	65-49580-13		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	C	RF
	65-49580-14		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	D	RF
	65-49580-15		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	E	RF
	65-49580-16		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	F	RF
	65-49580-17		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	G	RF
	65-49580-18		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	H	RF
	65-49580-19		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	I	RF
	65-49580-20		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	J	RF
	65-49580-21		FLIGHT SPOILER PWR CONTROL UNIT ACTUATOR ASSY	K	RF
1	MS21902D6		. UNION		1
2	NAS1612-6		. PACKING, O-RING		1
3	MS21916-6-4		. REDUCER		1
4	NAS1612-4		. PACKING, O-RING		1
5	65-44561-5		. PWR CONTROL UNIT ASSY (FIG. 1101)	A	1
5	65-44561-6		. PWR CONTROL UNIT ASSY (FIG. 1101)	B	1
5	65-44561-7		. PWR CONTROL UNIT ASSY (FIG. 1101)	C	1
5	65-44561-8		. PWR CONTROL UNIT ASSY (FIG. 1101)	D	1
5	65-44561-9		. PWR CONTROL UNIT ASSY (FIG. 1101)	E	1
5	65-44561-10		. PWR CONTROL UNIT ASSY (FIG. 1101)	F	1
5	65-44561-11		. PWR CONTROL UNIT ASSY (FIG. 1101)	G	1
5	65-44561-12		. PWR CONTROL UNIT ASSY (FIG. 1101)	H	1
5	65-44561-13		. PWR CONTROL UNIT ASSY (FIG. 1101)	I	1
5	65-44561-14		. PWR CONTROL UNIT ASSY (FIG. 1101)	J	1
5	65-44561-15		. PWR CONTROL UNIT ASSY (FIG. 1101)	K	1
5	251A1240-4		. PWR CONTROL UNIT ASSY (OPT) (SEE OHM 27-60-42, IPL FIG. 2)		1

VENDORS

V01414	AIRCRAFT POROUS MEDIA, INC., 2200 NORTHERN BLVD., EAST HILLS, NEW YORK 11548
V05228	PUROLATOR TECHNOLOGIES, INC., 950 RANCHO CONEJO BLVD., NEWBURY PARK, CALIFORNIA 91320
V09455	LEAR SIEGLER, INC., TRANSPORT DYNAMICS DIV., P.O. BOX 1953, 3131 W. SEGERSTROM AVE., SANTA ANA, CALIFORNIA 92702
V14818	PUROFLOW CORP., 1631 10TH ST., SANTA MONICA, CALIFORNIA 90404
V15860	NEW HAMPSHIRE BALL BEARINGS, INC., ASTRO DIV., 155 LEXINGTON AVE., LACONIA, NEW HAMPSHIRE 03246
V21335	FAFNIR BEARING CO., DIV. OF TEXTRON, INC., 37 BOOTH ST., NEW BRITAIN, CONNECTICUT 06050
V21550	BURNSWICK CORP., WINTEC DIV., 2313 S. SUSAN ST., SANTA ANA, CALIFORNIA 90045
V5F573	GREENE, TWEED AND CO., INC., 2075 DETWILER RD., KULPSVILLE, PENNSYLVANIA 19443
V50294	NMB AMERICA, INC., P. O. BOX 2515, 9730 INDEPENDENCE AVE., CHATSWORTH, CALIFORNIA 91311
V60029	DOWTY AEROSPACE CO., 1700 BUSINESS CENTER DR., DUARTE, CALIFORNIA 91010
V73134	HEIM UNIVERSAL CORP., INCOM INTERNATIONAL, INC., 60 ROUND HILL RD., FAIRFIELD, CONNECTICUT 06430
V77896	REXNORD INC., BEARING DIV., 2400 CURTIS ST., DOWNERS GROVE, ILLINOIS 60515
V79294	BORG-WARNER FLUID CONTROLS, BORG-WARNER CORP., P.O. BOX 2185, 7500 TYRONE AVE., VAN NUYS, CALIFORNIA 91409
V81376	SOUTHWEST PRODUCTS CO., 2240 BUENA VISTA ST., P.O. BOX 2046, IRWINDALE, CALIFORNIA 91706
V81873	HR TEXTRON, INC., SUB OF TEXTRON, INC., 25200 W. RYE CANYON RD., VALENCIA, CALIFORNIA 91355
V82106	PARKER-HANNIFIN CORP., CONTROL SYSTEMS DIV., 18001 VON KARMAN AVE., IRVINE, CALIFORNIA 92715

VENDORS (CONT)

V93835	NATIONAL WATERLIFT COMPANY, INC., DIV. OF PNEUMO DYNAMICS CORP., 2220 PALMER AVE., KALAMAZOO, MICHIGAN 49001
V97613	SARGENT INDUSTRIES, KAHR BEARING DIV., 3010 N. SAN FERNANDO BLVD., BURBANK, CALIFORNIA 91503
V97820	SHAMBAN POLYMER TECH GROUP, 711 MITCHELL RD, NEWBURY PARK, CALIFORNIA 91320-2214

Part No.	Fig. and Index No.	Qty. per Assy.
AC4638E1	1101-94	1
AC4638E11	1101-94	1
ADNE12-205	1101-44	1
AN960-416		AR
AN960PD416		AR
ART12E103	1101-44	1
ART12E104	1101-44	1
BACB30CW5H4	1101-27	4
BACB30US5K4	1101-27	4
BACB30US5K6H	1101-27	4
BACB30GW8-16	1102-6	1
BACC30M8	1102-2	1
BACN12A3MN	1101-106	1
BACP20AX06DA	1101-112	2
BACP20AX06DAP	1101-111	2
BACP20AX12D	1101-114	2
BACP20AX12D	1101-114	3
BACP20AX12DP	1101-113	2
BACP20AX12DP	1101-113	3
BACP20AX18	1101-48	2
BACP20AX18	1101-48A	2
BACP20AX18A	1101-48A	2
BACP20AX18AP	1101-47A	2
BACP20AX18D	1101-110	1
BACP20AX18DA	1101-116	1
BACP20AX18DAP	1101-115	1
BACP20AX18DP	1101-109	1
BACP20AX18P	1101-47	2
BACP20AX18P	1101-47A	2
BACP20AX25D	1101-118	1
BACP20AX25DP	1101-117	1
BACR12BD112NA	1102-23	1
BACR12BM006	1101-75	2
BACR12BM009	1101-25	2
BACR12BM011	1101-19	12
BACR12BM011	1101-22	2
BACR12BM012	1101-58	2
BACR12BM012	1101-95	2
BACR12BM110	1101-80	2
BACR12BM113	1101-67	2
BACR12BM113	1101-89	4
BACR12BM217	1101-92	2
BACR12BM223	1101-34	2
BACS11AA215A	1101-31	1
BACS12HL4AH10P	1101-15	1
BACS12HL4AH10P	1101-50	4

Part No.	Fig. and Index No.	Qty. per Assy.
BACS12HL4AH10P	1101-77	2
BACS12HL4AH14P	1101-13	1
BACS12HL4AH14P	1101-17	1
BACS12HL4AH28P	1101-11	1
BACS12HL4H10P	1101-15	1
BACS12HL4H10P	1101-50	4
BACS12HL4H10P	1101-77	2
BACS12HL4H14P	1101-13	1
BACS12HL4H14P	1101-17	1
BACS12HL4H28P	1101-11	1
BACS34A10A	1101-30	1
BAC27DHY11	1101-106	1
DBAF20-077	1101-9	2
DREM12-131	1101-44	1
FBJW40TF46-17	1101-9	2
FBE20A17BAC	1101-9	2
FBR20A17BAC	1101-9	2
GTC5394C-215	1101-30A	1
KBDE12-13	1101-44	1
KBDE12-16	1101-44	1
KJN20-12	1101-9	2
MSSKR1212-28BAD	1101-44	1
MSSKR1212-28BAE	1101-44	1
MS150457		AR
MS17825-4		AR
MS20002C5		AR
MS20613-2C8		AR
MS21209F4-5		AR
MS21902D6		AR
MS21916-6-4		AR
MS24665-152		AR
MS28774-015		AR
MS28782-1		AR
MS28782-11		AR
MS28782-22		AR
MS28782-25		AR
MS28782-4		AR
MS28782-6		AR
MS28782-7		AR
MS28782-8		AR
MS28783-1		AR
MS51923-197		AR
NAS1080E8		AR
NAS1423-12		AR
NAS1423-8		AR
NAS1351-4H10P		AR

Part No.	Fig. and Index No.	Qty. per Assy.
NAS1351-4H14P		AR
NAS1351-4H28P		AR
NAS1351N4H10P		AR
NAS1351N4H14P		AR
NAS1351N4H28P		AR
NAS1611-006		AR
NAS1611-009		AR
NAS1611-011		AR
NAS1611-012		AR
NAS1611-015		AR
NAS1611-110		AR
NAS1611-112		AR
NAS1611-113		AR
NAS1611-215		AR
NAS1611-217		AR
NAS1611-220		AR
NAS1611-223		AR
NAS1612-10		AR
NAS1612-12		AR
NAS1612-4		AR
NAS1612-6		AR
NAS509-12		AR
NAS509-8		AR
NHNE12-204	1101-44	1
NHNE12-205	1101-44	1
NHLF20-207A	1101-9	2
REMS24ATC24-3	1101-44	1
S11940-213H5	1101-10	3
S12003-10-6	1101-84	1
S12003-113-6	1101-73	1
S12003-12-6	1101-82	1
S12095-215-5	1101-31	1
S33121-215-99	1101-31	1
S30775-213H5	1101-10	3
S30855-213H5N	1101-10	3
YTM182	1101-44	1
YTM212	1101-44	1
YTS570	1101-9	2
1001PB0750	1101-99	1
10-60503-4	1101-88	2
10-60516-244	1101-9	2
10-60779-175	1101-44	1
10-60779-182	1101-44	1
10-60779-182A	1101-44	1
10-60808-1	1101-94	1
10-60808-3	1101-94	1
10-60809-1	1101-57	1
1151-103	1101-99	1

Part No.	Fig. and Index No.	Qty. per Assy.
17117	1101-70	1
177168	1101-44	1
177275	1101-44	1
21-10034	1101-94	1
21-11175	1101-94	1
251A1240-4	1103-5	1
2720-0	1101-57	1
33283	1101-39A	1
4245-501	1101-94	1
59800-5001	1101-57	1
62000-5003	1101-88	2
65-44561-10	1101	RF
65-44561-10	1103-5	1
65-44561-11	1101	RF
65-44561-11	1103-5	1
65-44561-12	1101	RF
65-44561-12	1103-5	1
65-44561-13	1101	RF
65-44561-13	1103-5	1
65-44561-14	1101	RF
65-44561-14	1103-5	1
65-44561-15	1101	RF
65-44561-15	1103-5	1
65-44561-5	1101	RF
65-44561-5	1103-5	1
65-44561-6	1101	RF
65-44561-6	1103-5	1
65-44561-7	1101	RF
65-44561-7	1103-5	1
65-44561-8	1101	RF
65-44561-8	1103-5	1
65-44561-9	1101	RF
65-44561-9	1103-5	1
65-44562-1	1101-46	1
65-44562-2	1101-49	1
65-44565-2	1101-119	1
65-44565-3	1101-107	1
65-44565-4	1101-107	1
65-44565-5	1101-119	1
65-44565-6	1101-107	1
65-44569-1	1101-45	1
65-44569-2	1101-45	1
65-44573-1	1102-10	1
65-44573-2	1102-10	1
65-44762-1	1101-66	1
65-49580-11	1103	RF
65-49580-12	1103	RF
65-49580-13	1103	RF

Part No.	Fig. and Index No.	Qty. per Assy.
65-49580-14	1103	RF
65-49580-15	1103	RF
65-49580-16	1103	RF
65-49580-17	1103	RF
65-49580-18	1103	RF
65-49580-19	1103	RF
65-49580-20	1103	RF
65-49580-21	1103	RF
66-22710-1	1101-6	1
66-22714-1	1101-38	1
66-22715-1	1101-40	1
66-22717-1	1101-41	1
66-22719-1	1101-71	1
66-22720-1	1101-62	1
66-22739-2	1102-16	1
66-22740-1	1102-8	1
66-22741-1	1102-11	1
66-22742-2	1102-17	1
66-22742-3	1102-17	
66-22743-1	1101-100	1
66-22743-2	1101-100	1
66-22743-4	1101-100	1
66-22744-2	1102-22	1
66-22745-1	1102-14	1
66-22746-1	1101-103	1
66-22748-1	1102-7	2
66-22772-1	1101-21	3
66-22773-1	1101-55	1
66-22774-1	1101-86	2
66-22774-2	1101-86	2
66-22775-2	1102-12	1
66-22775-3	1102-12	1
66-22775-4	1102-12	1
66-22781-1	1101-12	1
66-22781-1	1101-14	1
66-22781-1	1101-16	1
66-22781-1	1101-18	1
66-22782-1	1101-42	1
66-22783-1	1102-15	1
66-22807-1	1101-39	1
69-35526-1	1102-9	1
69-35541-1	1101-60	1
69-35541-2	1101-60	1
69-35541-3	1101-60	1
69-35546-1	1101-102	1
69-35546-2	1101-102	1
69-35547-1	1101-101	1
69-35547-2	1101-101	1

Part No.	Fig. and Index No.	Qty. per Assy.
69-35549-1	1101-33	1
69-35549-2	1101-33	1
69-35558-1	1101-29	1
69-35559-1	1101-91	1
69-35589-2	1102-21	1
69-35590-2	1102-18	1
69-35590-3	1102-18	1
69-35591-2	1101-85	1
69-35592-2	1101-83	1
69-35593-1	1102-19	1
69-35595-1	1102-25	1
69-35597-1	1101-79	1
69-35638-3	1102-20	2
69-35638-4	1101-54	1
69-35638-4	1102	RF
69-35638-5	1101-54	1
69-35638-5	1102	RF
69-35638-6	1101-54	1
69-35638-6	1102	RF
69-35638-7	1101-54	1
69-35638-7	1102	RF
69-35696-1	1101-5	2
69-35697-2	1101-7	1
69-35697-4	1101-1	1
69-35697-5	1101-8	1
69-35697-6	1101-1	1
69-35697-7	1101-7	1
69-35888-1	1101-24	1
69-35903-1	1101-63	1
69-35903-2	1101-65	1
69-35904-3	1102-2	1
69-35939-1	1101-97	1
69-35953-1	1101-74	1
69-35954-1	1101-69	1
69-35955-1	1101-72	1
69-35973-1	1102-3	1
69-54599-1	1101-57	1
69-54659-1	1101-102B	1
69-54659-2	1101-99A	1
69-54660-1	1101-102A	1
69-54660-2	1101-102A	1
69-54670-1	1101-70	1
69-54788-1	1101-99	1
69-74726-1	1101-39A	1
7222MT952T	1101-35A	1
7500271	1101-94	1
90560	1101-9	2