

Wilfley

HYDROVOIR

Assembly Instructions

Model AG



WILFLEY

WILFLEY MODEL AG PUMP HYDROVOIR ASSEMBLY INSTRUCTIONS

The Hydrovoir is a revolutionary sealing device that can be fitted to existing Wilfley AG and AF pumps. The Hydrovoir prevents leakage during start-up and shut-down of Wilfley Centrifugal Pumps. The simple mechanical operation of the Hydrovoir combined with the hydraulic sealing action of the Wilfley expeller provides efficient, leak-free pumping of corrosive materials.

The Hydrovoir is available on new Wilfley AF and AG centrifugal pumps. Traditional AF and AG pumps can be retrofitted with the Hydrovoir. The retrofit kits are designed to minimize the replacement of standard parts. Gasket kits and parts kits are also available to rebuild your Hydrovoir. See the complete listings of kits and parts on page 20.

The Hydrovoir_R is manufactured by A. R. Wilfley and Sons, Inc. under Patent #4,915,579 with additional patents pending.

Hydrovoir_R is a registered trademark of A. R. Wilfley and Sons, Inc.

HYDROVOIR INSTALLATION AND MAINTENANCE

The instructions in this booklet are designed for easy installation and maintenance of your Hydrovoir. These instructions should be used with the Wilfley Model AG Operating Handbook, which covers general pump maintenance, operating procedures, safety precautions, and standard parts lists.

This booklet is divided into two major sections:

1. Hydrovoir Installation - Installing the Hydrovoir into AG Pump frames;
2. Hydrovoir Rebuilding - Detailed procedures to keep your Hydrovoir in top condition.

Before you begin working on any Wilfley centrifugal pump, please drain and decontaminate the entire unit. Decontamination is especially important with the Hydrovoir reservoir. Please observe all safety precautions.

It is recommended that an anti-seize compound be used on all stainless steel bolt threads to prevent galling. Please replace all gaskets and o-rings if their seal surfaces have been disturbed during maintenance. The impeller provides compression of the front and rear actuator gaskets 95 A and N. If the impeller is removed, the Teflon®-based actuator gaskets must be replaced.

Some special tools and lubricants have been included in your Hydrovoir pump kit to assist assembly. They include:

1. 5/32 "T" handle Allen wrench
2. Synthetic grease
3. Anti-seize compound

To complete assembly you will need standard 1/2", 9/16" and 15/16" box end wrenches and feeler gauges. A magnetic base dial indicator will be needed to verify the alignment of the shaft and frame. If you have any questions regarding these instructions or the operation of the Hydrovoir, please call a Wilfley Service Engineer at 1-800-525-9930.

**MODEL AG HYDROVOIR
HYDROVOIR INSTALLATION INSTRUCTIONS**

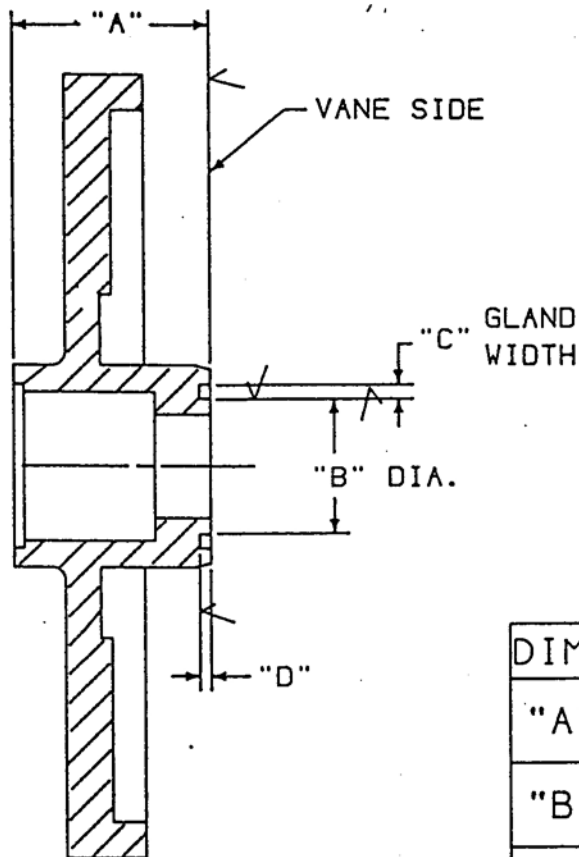
**HYDROVOIR RETROFIT KITS ARE SHIPPED PREASSEMBLED TO
PREVENT DAMAGE DURING TRANSIT.**

**ANY TEFLON®-BASED GASKET DISTURBED DURING DISASSEMBLY
MUST BE REPLACED.**

1. Remove the case (50) from the frame assembly; the case will be used again with a new case gasket (49).
2. Unscrew the impeller (48) from the shaft; the impeller will be used again with a new impeller o-ring (47).

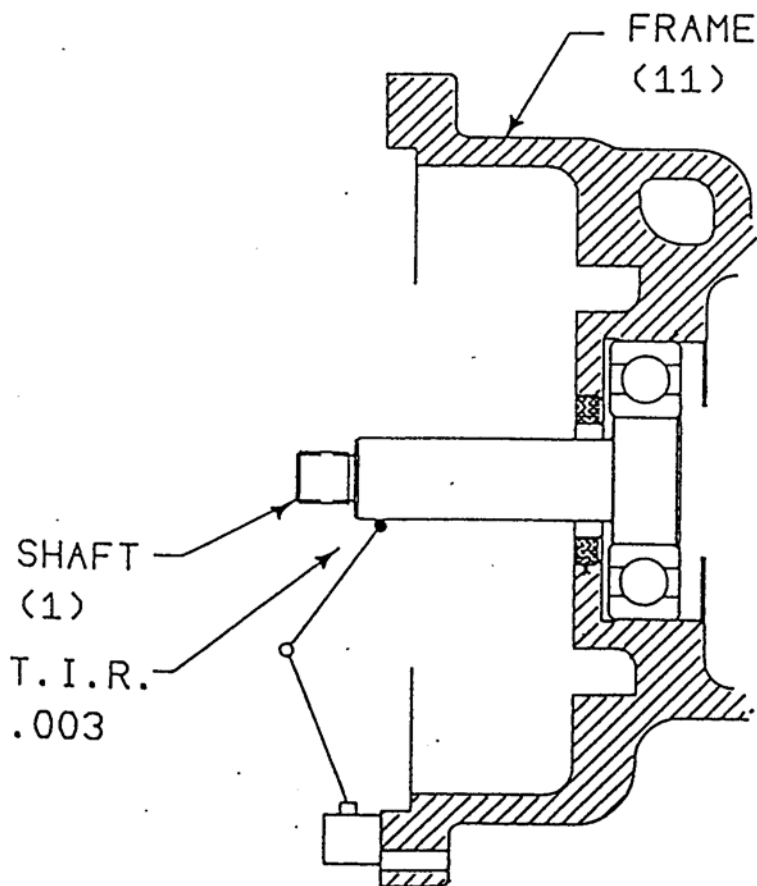
- Remove the stationary seal ring housing assembly. The case plate (32) will be used again with a new case plate gasket (38); please be sure it is clean and free of corrosion. The following parts will not be used in the Hydrovoir: the used case gasket (49), rotary seal housing (34), rotary seal housing seal (36), rotary seal ring (37), the used case plate gasket (38), governor spring (42), actuator body (43), and stationary seal ring housing (39).

The standard AG expeller (33) can be used with the Hydrovoir if it has been machined as shown in the following drawing.

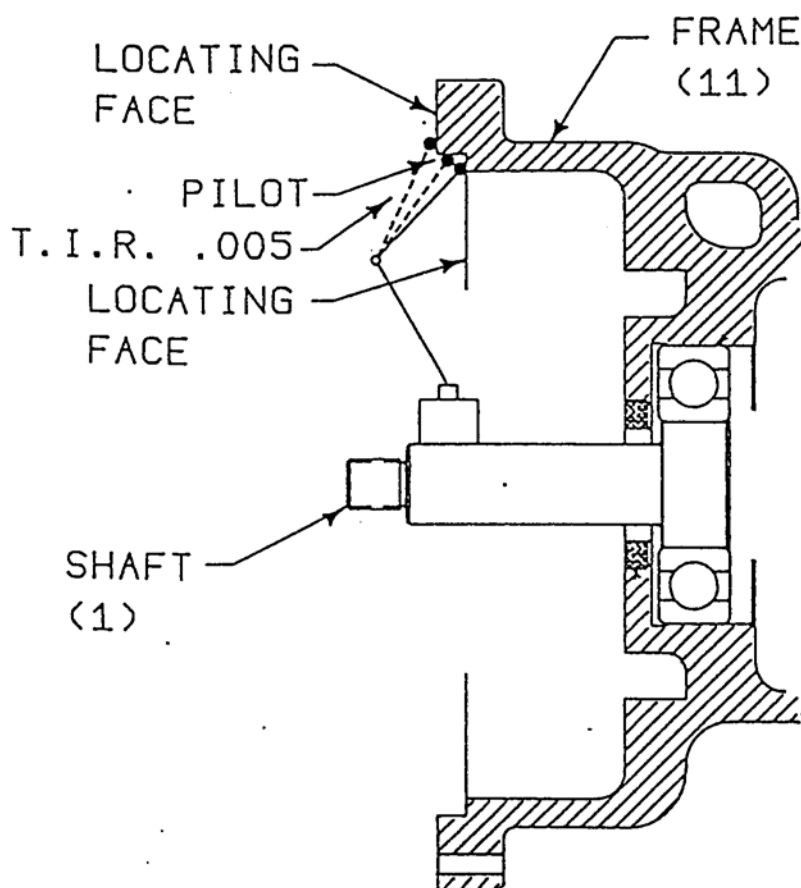


FRAME SIZE				
DIM.	1	2	3	4
"A"	1.148 1.146	1.249 1.247	1.506 1.504	1.387 1.385
"B"	1.250 1.247	1.650 1.647	2.137 2.134	2.885 2.882
"C"	.067 .071	.083 .088	.083 .088	.124 .130
"D"	.052 .056	.050 .054	.050 .054	.070 .076

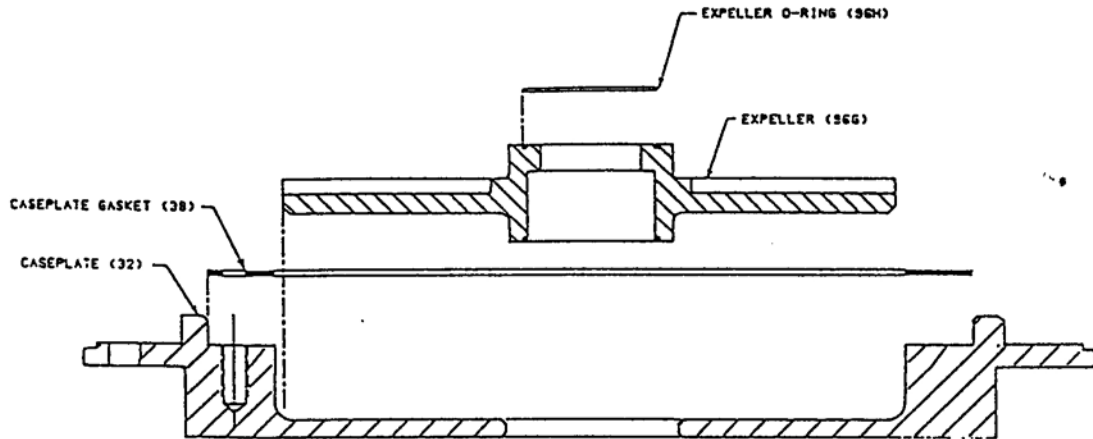
4. Remove the governor sleeve (28) and governor sleeve o-ring (29) from the shaft (1); these parts will not be used again.
5. Inspect the bearings. To determine the condition of the bearings, slowly rotate the shaft; there should be no points of drag, hangups, looseness or ability to wiggle or cock. If bearings need replacement, please refer to bearing assembly instructions in the AG Operating Handbook on page 6.
6. Check the shaft runout. Mount the dial indicator on the frame (11) and sweep the end of the shaft (1) close to the thread relief. A total indicator reading in excess of .003 inches is cause to replace the shaft.



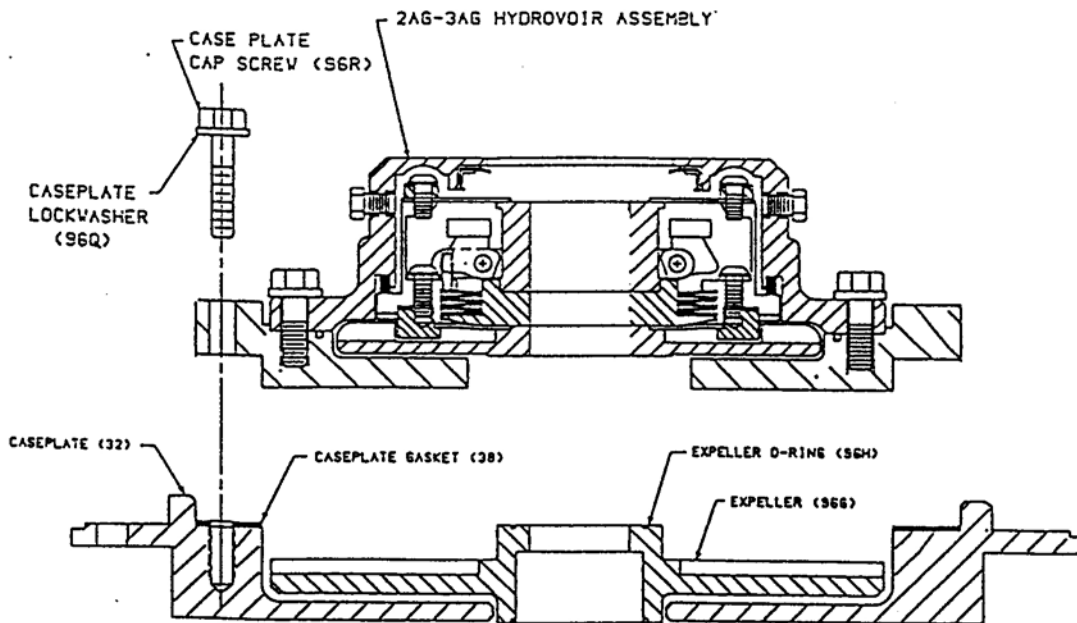
7. Check the squareness and concentricity of the frame. Mount a dial indicator on the shaft (1) close to the threaded end and sweep the frame (11) pilot and locating faces. Total indicator readings on any locating surface in excess of .005 inches are cause to replace the frame. Be especially aware of corrosion on the lower half of the pilot diameter.



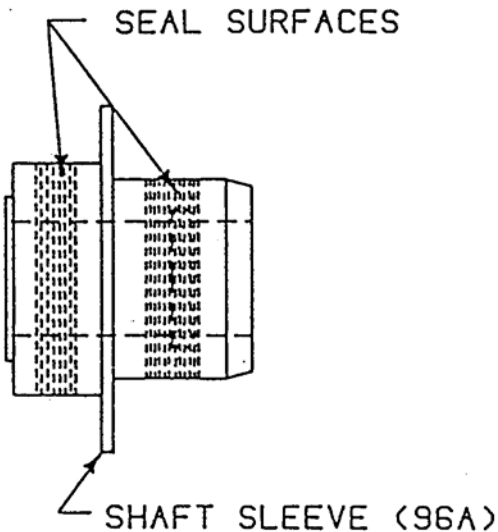
8. Place the new expeller (96G) into the cavity of the case plate (32). Install a new case plate gasket (38) into the case plate and a new expeller o-ring (96H) on the expeller hub. Lubricate the expeller o-ring with synthetic grease to ensure it remains in place during assembly.



9. Place the Hydrovoir onto the case plate (32) and secure with case plate cap screws (96R) and case plate lockwashers (96Q). The Frame 1 Hydrovoir assembly bolts through the expeller plate into the case plate. The Frames 2, 3 and 4 hydrovoir assemblies bolt directly to the case plate.



10. Check seal surfaces of shaft sleeve (96A) for smoothness. Lubricate both seal surfaces with synthetic grease. Push the shaft sleeve into the reservoir seal (96J), with large diameter down and chamfer up. The shaft sleeve will help protect the reservoir seal during assembly.



11. Slide the caseplate and Hydrovoir assembly onto the shaft (1). Seat the caseplate (32) against the frame (11). Be sure the flat side of the reservoir (96B) is facing down at 6 o'clock.
12. Install a new impeller o-ring (47) on the impeller (48).
13. Apply anti-seize to the shaft threads. Thread the impeller (48) onto the shaft (1), holding the impeller stationary and turning the shaft (this prevents crimping of the impeller o-ring). Retorque the impeller after 10 minutes to accommodate the cold flow characteristics of the Teflon®-based gaskets.

14. Check the clearance between the impeller and the case plate (32). Pump clearance instructions can be found in the AG Operating Handbook on page 11.

<u>Frame</u>	<u>Impeller Clearance</u>
1 and 2	.030 inches
3	.045 inches
4	.050 inches

15. Install the case gasket (49) and case (50) onto the frame (11). Torque the case bolts and nuts (60, 61) or case cap screws (51) in a "criss-cross" pattern in equal increments up to the final torque requirements listed below. Retorque the case bolts after 10 minutes to accommodate the cold flow characteristics of the Teflon®-based gasket.

<u>Case Bolt Dia.</u>	<u>Case Bolt Torque</u>
1/2 Inches	39 - 48 Foot - Pounds
5/8 Inches	83 - 100 Foot - Pounds
3/4 Inches	105 - 140 Foot - Pounds
7/8 Inches	160 - 215 Foot - Pounds
1 Inch	235 - 320 Foot - Pounds
1 1/8 Inches	260 - 340 Foot - Pounds

Testing for the accompanying torque values was done using dry surfaces. Lubrication and surface finish will effect these values significantly. Therefore, these values should be used as guidelines only.

16. Rotate the shaft after the final assembly. A slight drag should be felt due to seal face contact.

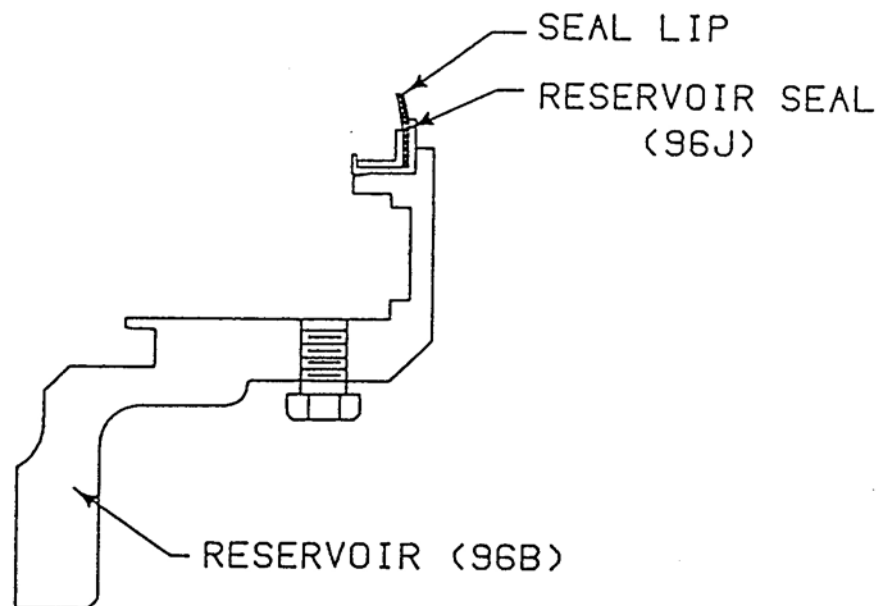
YOUR PUMP IS NOW READY TO BE RETURNED TO SERVICE. PLEASE REFER TO THE PUMP INSTALLATION AND OPERATION RECOMMENDATIONS IN THE AG OPERATING HANDBOOK PAGE 3 AND 4.

MODEL AG HYDROVOIR
HYDROVOIR REBUILDING INSTRUCTIONS

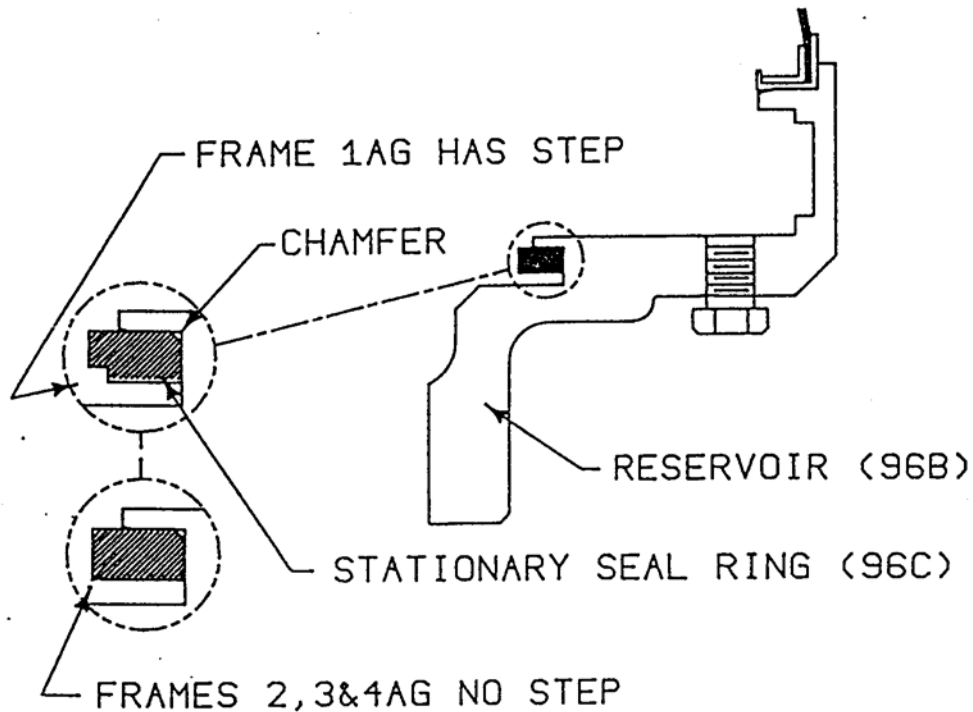
REFER TO THE FOLLOWING STEPS FOR COMPONENT REPAIR OR REPLACEMENT OF YOUR HYDROVOIR UNIT. ANY TEFLON GASKET DISTURBED DURING DISASSEMBLY OR REASSEMBLY MUST BE REPLACED.

DRAIN AND DECONTAMINATE THE RESERVOIR (96B) BEFORE DISASSEMBLY.

1. Visually inspect the reservoir seal (96J) lip surface for roughness and cracks. Replace the seal if any damage is detected. Press the seal into the reservoir (96B) with the seal lip facing into the reservoir cavity. Be sure the seal is fully seated in the reservoir and the seal lip is not damaged.

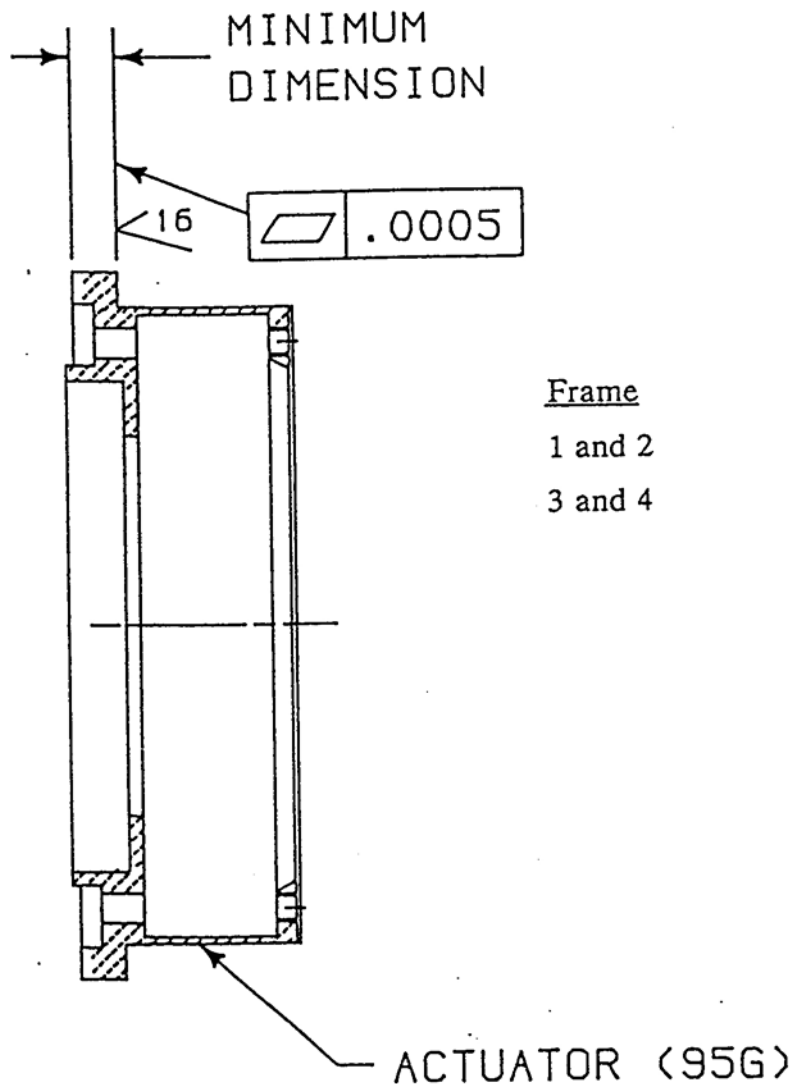


2. Remove the stationary seal ring (96C). Thoroughly clean the seal ring groove in the reservoir; the bottom of this groove functions as a seal surface. Carefully stretch a new stationary seal ring, with chamfered side down, into the groove in the reservoir. Seat the seal ring firmly by pressing the actuator (95G) down over the seal using only hand pressure. DO NOT USE AN ARBOR PRESS!!



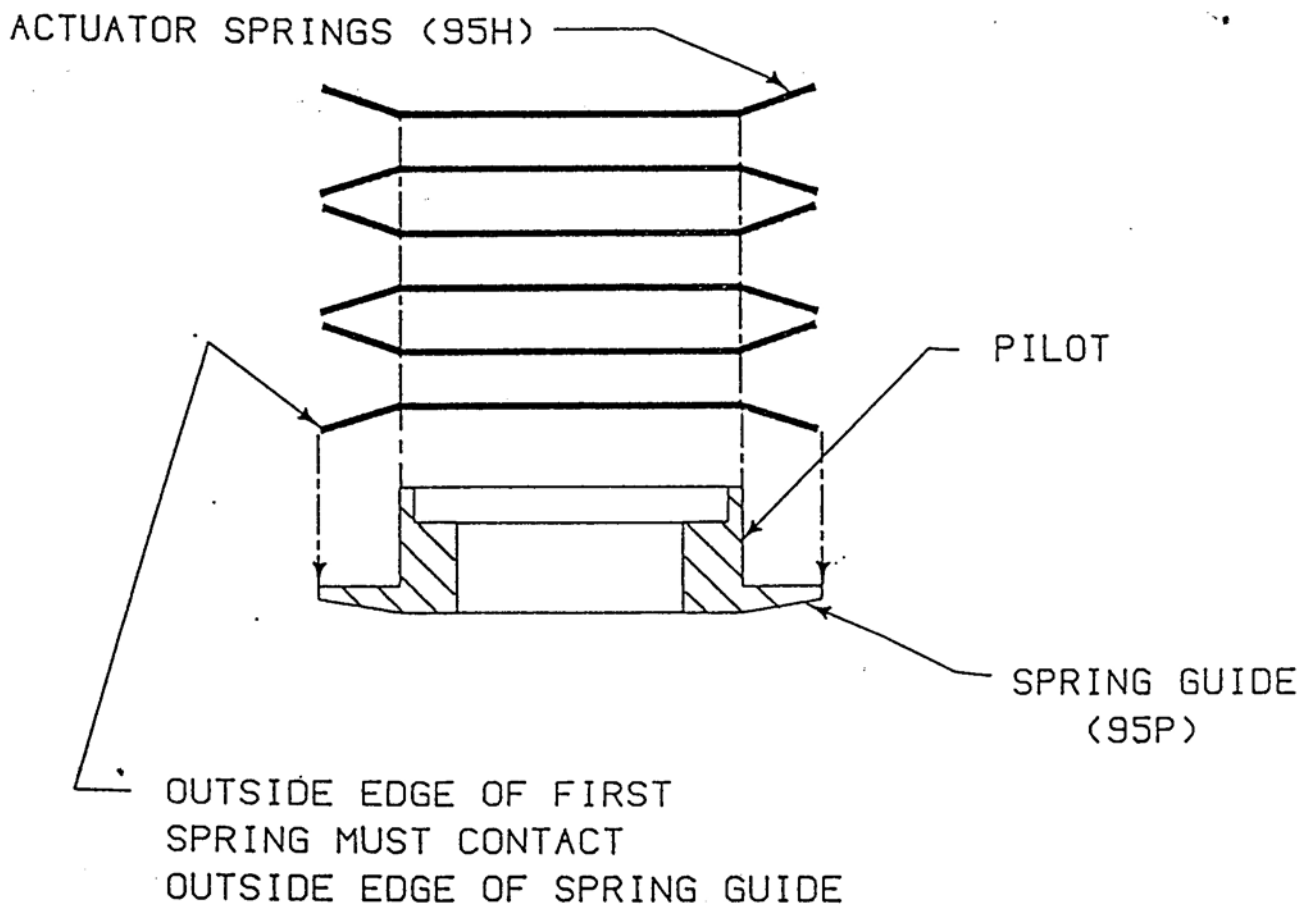
3. Apply Teflon tape or equivalent to both reservoir plugs (96M), and screw them into the reservoir. Be sure the bottom plug (on flat side) is flush or below the inside surface of the reservoir.

4. Visually inspect the actuator (95G) seal surface for scratches, uneven wear, areas of non-contact, or product buildup. Any defects are cause to repair or replace the actuator. The seal surface may be machined until reaching the minimum dimension shown in the following drawing. A smooth, flat surface within .0005 inches is critical for proper sealing.



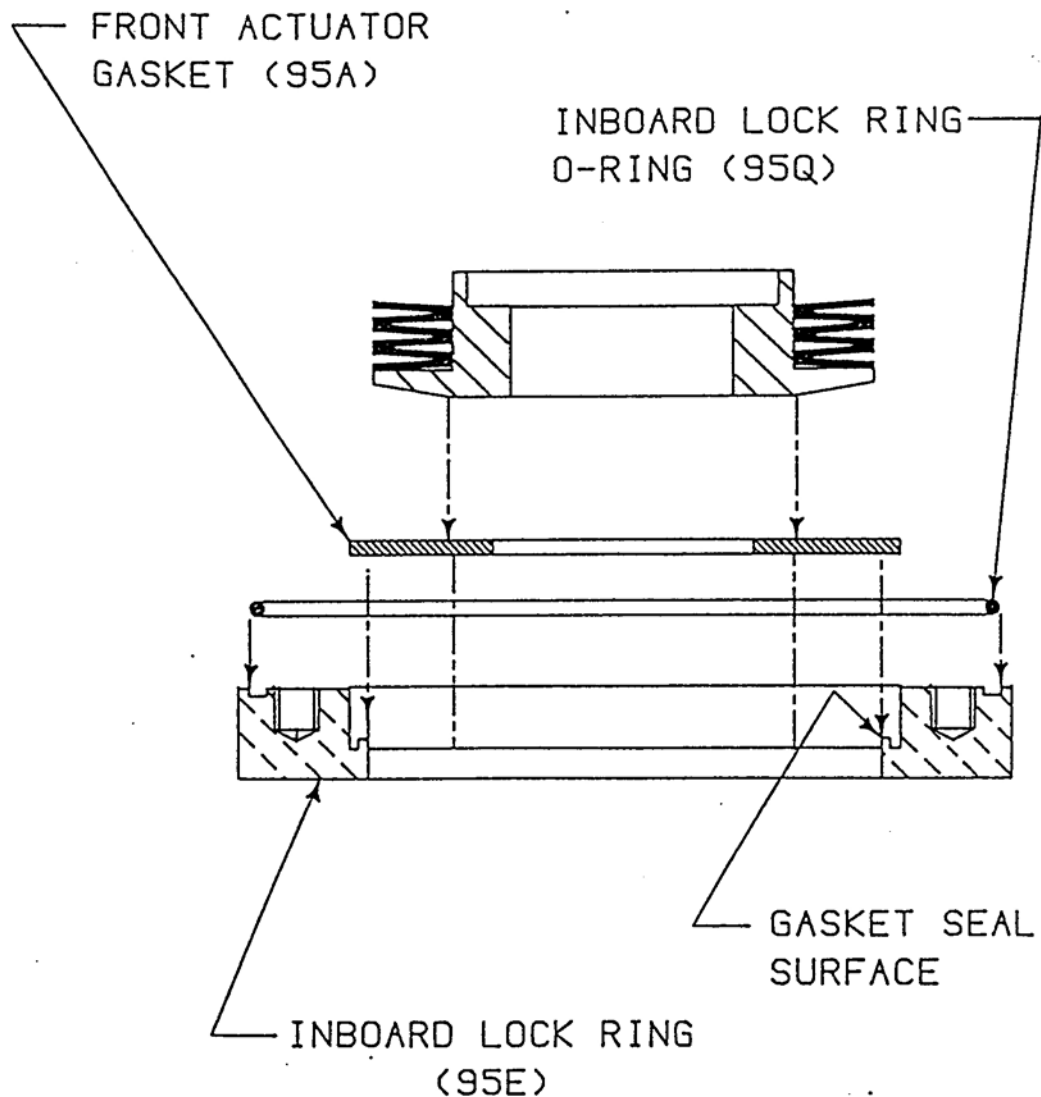
5. Inspect the spring guide (95P) pilot to ensure a smooth surface; replace if necessary. Inspect the inside diameter of the actuator springs (95H). The entire spring set must be replaced if damage is found on any spring disc.

Apply molybdenum-based high pressure grease to both sides of each actuator spring (95H). Stack actuator springs, alternating spring bends, on the spring guide (95P) as shown below. It is important that the outside edge of the first spring be in contact with the outside edge of the spring guide.

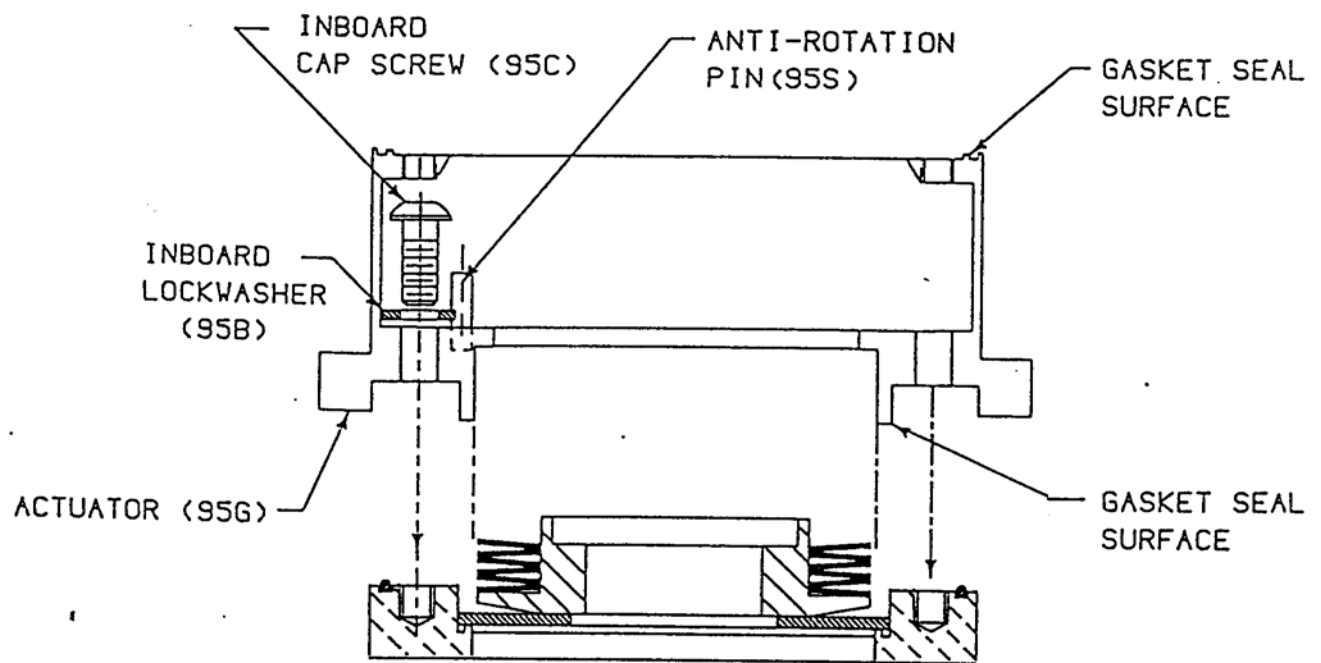


<u>Frame</u>	<u>Number of Springs</u>
1	8
2	6
3	4

6. Check the gasket and o-ring surfaces of the inboard lock ring (95E); they should be smooth and free of nicks. Place the inboard lock ring on a table with the threaded holes facing up. Insert the inboard lock ring o-ring (95Q) into the groove in the lock ring. Install the front actuator gasket (95A) into its recess in the lock ring. Center the spring guide and springs on top of the gasket.

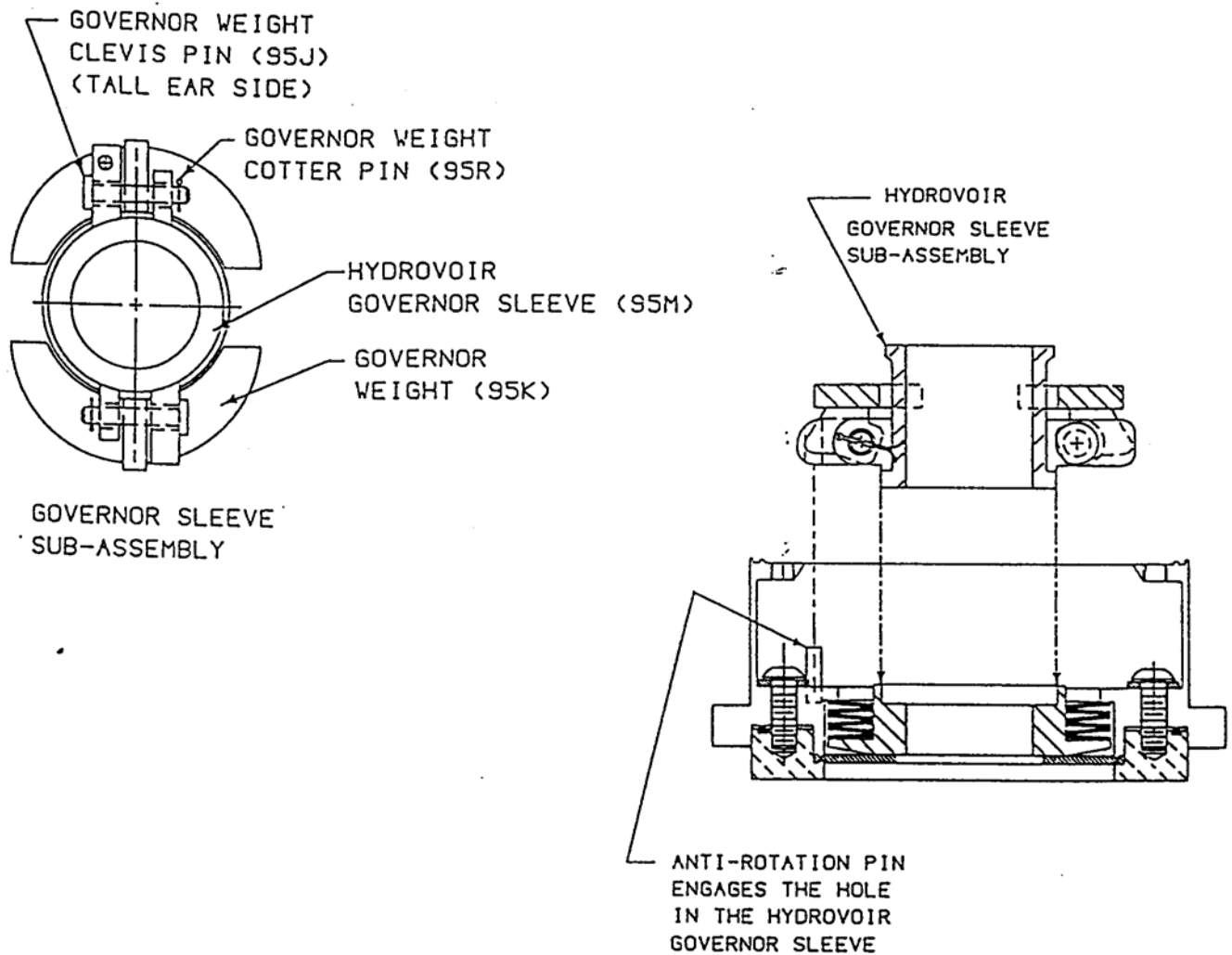


7. Check the gasket surfaces of the actuator to be sure they are smooth and free of nicks. Be sure the anti-rotation pin (95S) is securely mounted on the actuator. Place the actuator (95G) over the spring guide and onto the inboard lock ring (95E). Attach these components together with inboard lockwasher and inboard cap screws (95 B,C) using the "T" handle Allen wrench. Slight compression of the springs is required to engage the threads. If Teflon®-based gaskets are used, retorque these screws after 10 minutes to accommodate the cold flow characteristics of Teflon®-based.

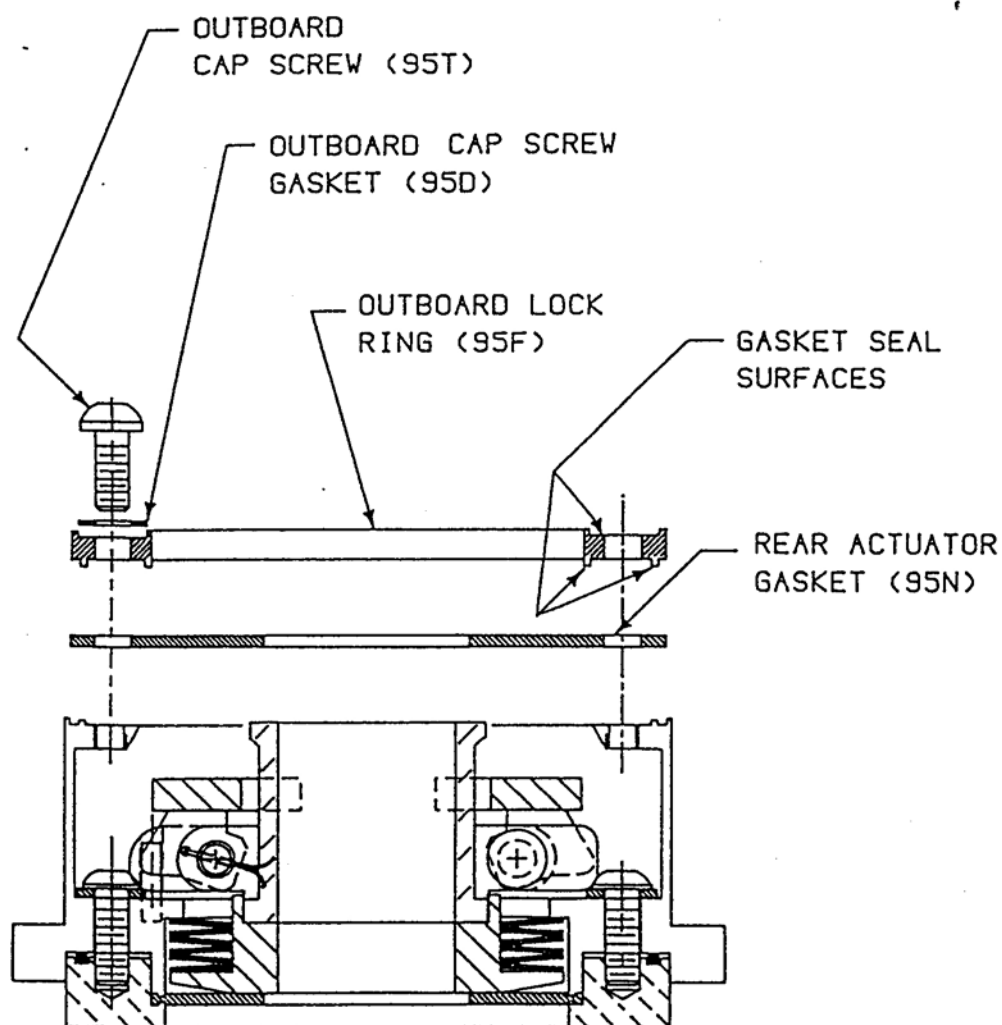


8. Install the governor weights (95K) on the hydrovoir governor sleeve (95M) using governor weight clevis pins and governor weight cotter pins (95J,R). THE HEAD OF THE CLEVIS PIN MUST CONTACT THE TALL EAR OF THE HYDROVOIR GOVERNOR SLEEVE. THE TWO WEIGHTS MUST BE IDENTICAL.

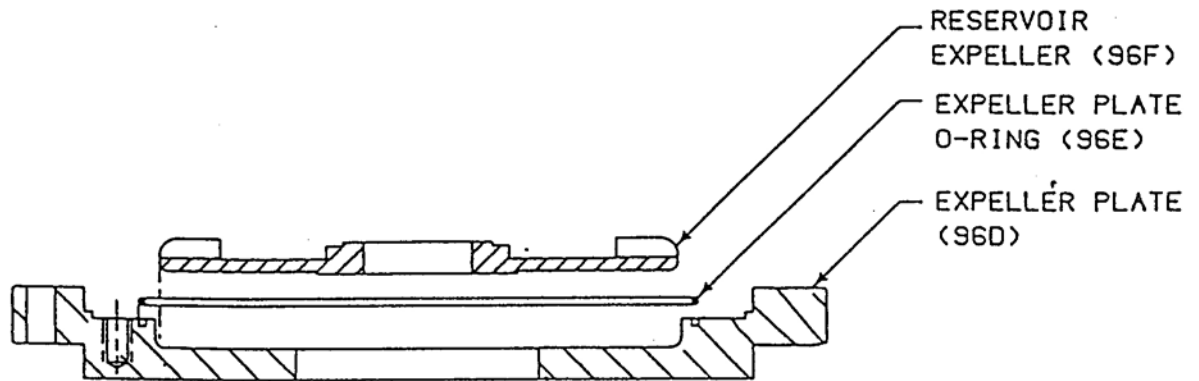
Place the hydrovoir governor sleeve assembly in the spring guide recess so that the anti-rotation pin (95S) engages the hole in the hydrovoir governor sleeve.



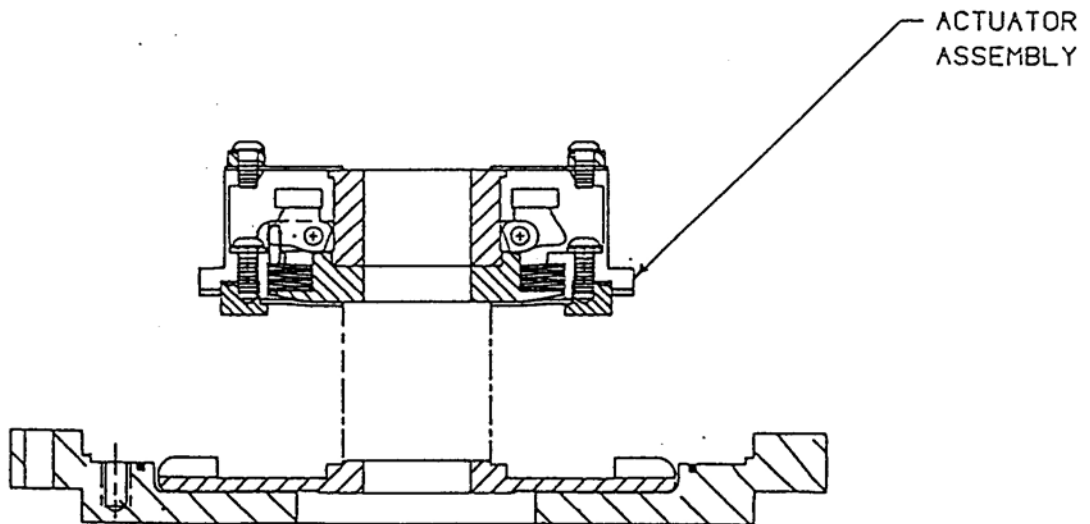
9. Check the gasket seal surfaces of the outboard lock ring (95F) to be sure they are smooth and free of nicks. Install the rear actuator gasket (95N) on the actuator (95G). Place the outboard lock ring (95F) on the gasket so the cap screws will be recessed. Seal the actuator subassembly with outboard cap screws and outboard gaskets (95 T,D). Retorque these screws after 10 minutes to accommodate the cold flow characteristics of the Teflon®-based gaskets.



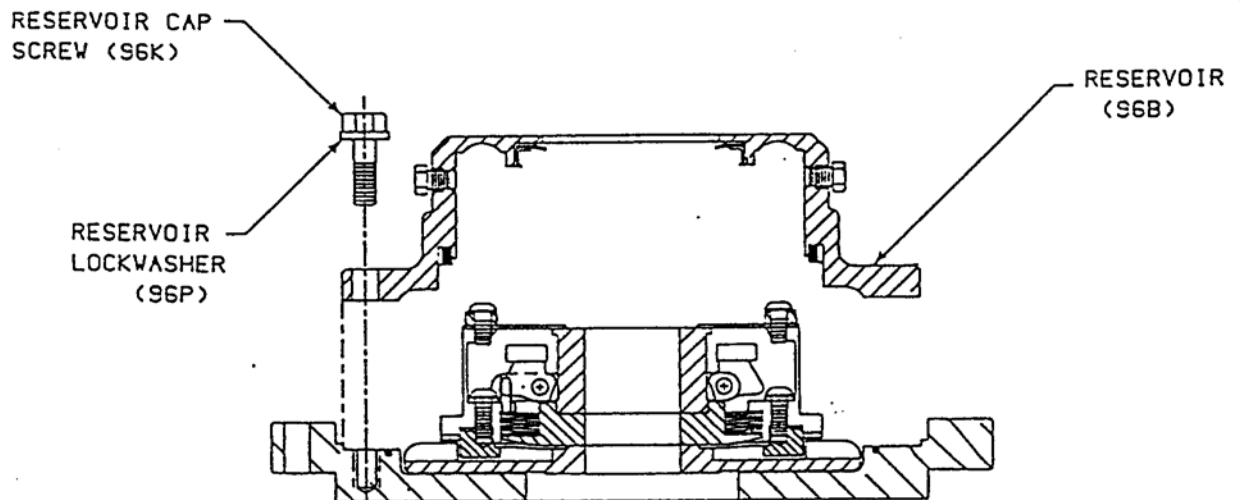
10. Place the reservoir expeller (96F) into the cavity of the expeller plate (96D) with the vanes facing up. Insert the expeller plate o-ring (96E) into the groove of the expeller plate. Lubricate the o-ring with synthetic grease to hold it in place during assembly.



11. Set the actuator assembly (95) onto the hub of the reservoir expeller (96F). The exposed outboard cap screws (95T) should be facing up. ALIGN THE SPRINGS BY PUSHING DOWN ON THE ACTUATOR SUBASSEMBLY TWICE.



12. Place the reservoir (96B) over the actuator assembly. The Frame 1 assembly will be bolted to the case plate on final assembly. Frame 2, 3 and 4 reservoirs bolt to the expeller plate with reservoir lockwashers and reservoir cap screws (98P, K). The reservoir has an uneven bolt pattern with three holes on the upper half and four in the lower or the flat side of the reservoir. To aid assembly, match the alignment marks on the reservoir and expeller plate.



THE HYDROVOIR IS NOW READY FOR INSTALLATION INTO A WILFLEY MODEL AG PUMP. PLEASE REFER TO HYDROVOIR INSTALLATION INSTRUCTIONS, PAGE 7, TO COMPLETE PUMP ASSEMBLY.

IF THERE ARE ANY QUESTIONS CONCERNING THESE PROCEDURES, PLEASE CONTACT YOUR LOCAL WILFLEY REPRESENTATIVE OR A WILFLEY SERVICE ENGINEER AT 1-800-525-9930.

ACTUATOR ASSY.
 PUMP & HYDROVOIR
 GASKET KIT
 HYDROVOIR
 GASKET KIT
 SPRING KIT

ITEM #	QUANTITY	DESCRIPTION	950	880	890	540
95A	1	FRONT ACTUATOR GASKET	1	1	1	
95B	AS REQ'D	INBOARD LOCKWASHER	AR			
95C	AS REQ'D	INBOARD CAP SCREW	AR			
95D	AS REQ'D	OUTBOARD CAP SCREW GASKET	AR	AR	AR	
95E	1	INBOARD LOCK RING	1			
95F	1	OUTBOARD LOCK RING	1			
95G	1	ACTUATOR	1			
95H	AS REQ'D	ACTUATOR SPRING	AR			AR
95J	2	GOVERNOR WEIGHT CLEVIS PIN	2			
95K	2	GOVERNOR WEIGHT	2			
95M	1	HYDROVOIR GOVERNOR SLEEVE	1			
95N	1	REAR ACTUATOR GASKET	1	1	1	
95P	1	SPRING GUIDE	1			
95Q	1	INBOARD LOCK RING O-RING	1	1	1	
95R	2	GOVERNOR WEIGHT COTTER PIN	2			
95S	1	ANTI-ROTATION PIN (Not Shown)	1			
95T	AS REQ'D	OUTBOARD CAP SCREW	AR			
96A	1	SHAFT SLEEVE				
96B	1	RESERVOIR				
96C	1	STATIONARY SEAL RING		1	1	
96D	1	EXPELLER PLATE				
96E	1	EXPELLER PLATE O-RING		1	1	
96F	1	RESERVOIR EXPELLER				
96G	1	EXPELLER				
96H	1	EXPELLER O-RING		1		
96J	1	RESERVOIR SEAL		1	1	
96K	AS REQ'D	RESERVOIR CAP SCREW				
96M	2	RESERVOIR PLUG				
96N	1	SHAFT SLEEVE O-RING		1		
96P	AS REQ'D	RESERVOIR LOCKWASHER				
96Q	AS REQ'D	CASE PLATE LOCKWASHER				
96R	AS REQ'D	CASE PLATE CAP SCREW				
17	1	FRONT BEARING OIL SEAL		1		
38	1	CASE PLATE GASKET		1		
47	1	IMPELLER O-RING		1		
48	1	IMPELLER				
49	1	CASE GASKET		1		
50	1	CASE				

AR= As Required