GT- Series Hydraulic Pump Service Instructions

Pump Disassembly Procedure

1. With a grease pencil, ink marker or metal stamp, mark each housing or cover on the parting line in a way that will enable you to reassemble the parts in the same position when you put the unit back together.
2. Clamp the unit in a vise, shaft end up. Use clean wooden blocks or other soft material to protect the machined surfaces (port faces) from damage.
3. Clean the drive shaft extension and remove any burrs. This will prevent damage to the shaft seal lips.
4. Remove the capscrews, or nuts. Lift flange straight up. If flange is stuck, tap with a soft non-metallic hammer.
5. Remove O-ring.
6. Line up the drive gear, pulling the pressure plate with it while holding the pressure plate face against the gear face with your fingers. Remove the pressure plate from drive gear. If the pressure plate hangs during removal, do not force or bend the plate. Tap lightly with a soft non-metallic hammer to drive the plate back down flat again and start over.
7. Lift the idler gear straight out of body.
8. Examine the gear bores. Normal gear track-in on the suction side of the body is approximately .005 inches, but should not exceed .015 inches. If track-in burr is rolled over O.D. of the bottom pressure plate, remove burr by using a sharp knife. Blow out with air to remove all loose chips. Lift bottom pressure plate out. Keep plate flat while removing to prevent binding or bending. Do not force if plate binds. Remove all sealing strips from grooves in back side of pressure plates.
9. If unit has multiple sections, proceed with same steps each section.
10. Wash all parts with clean solvent and blow dry. Inspect all parts for wear. (Do not confuse normal gear bore track-in for wear.) Check for cracks.
11. If pressure plates show excessive wear on gear face side, grooves, scoring, contaminant abrasion wear, cavitation damage or heat discoloration, replace with new ones.
12. If gears have excessive wear on journals, gear face surfaces or area running under shaft seal lips, replace with new ones. Journal wear is excessive if contamination has caused the journal surfaces to lose their mirror finish and appear “sanded” or scratched. Check the gear O.D. for excessive wear. Contact the Allied Systems Service Department for specific measurements.
13. Always install new parts for anything showing excessive wear. Always replace seals and O-rings when a unit has been disassembled.

Pump Assembly Procedure

1. Always install new soft goods kit, which includes all seals, O-rings, pressure balance seal strips, etc. See specific instructions for shaft seal replacement.
2. Place clean body (last section body if multiple unit) on clean workbench with open bore end facing up. Select the bottom pressure plate to be installed first. This plate will have a radius on the outer edge that mates with bottom of gear bore. (The top plate has square corners with no radius.) Install new pressure balance seal strips into groove on back of plate, using heavy grease to hold in place. Uni-directional pumps use two strips per groove. Motors and bi-directional pumps use one strip per groove, but have two grooves. They also require seal rings around the bearings that slip into the plate counter bore during assembly. Seal strip must be in place until plate is completely to the bottom of bore. It may be necessary to help the strip slide past bearing ends near bottom of gear bore. (A small screwdriver with the tip bent 90° makes a good tool for guiding the strip past the bearing.)
3. Install the drive and idler gears, making sure they go back into the same position as removed. If the positions are switched, the pump will be assembled for opposite rotation. Coat the journals and gear faces with hydraulic oil before and during assembly.
4. Install the top pressure plate with the grooves facing up. Uni-directional pumps have a trap relief on the surface facing the gear. The plate should be assembled so that the trap is off-centered towards the discharge side of the pump (outlet). Install the pressure balance seal strips in plate.
5. Before installing flange (or bearing plate in the case of a multiple section unit) check to see that all dowels are accounted for and in proper holes.

6. If new shaft seals have not been installed in flange, do so now using the "Seal Replacement" procedures detailed below. Assemble the flange O-ring into groove using heavy grease.

   NOTE: THERE ARE TWO TAPPED HOLES IN THE FLANGE FACING THE PRESSURE PLATE. THE HOLE ON THE DISCHARGE (PRESSURE) SIDE IS PLUGGED WITH A THREADED PLUG ON UNI-DIRECTIONAL PUMPS. NORMALLY THIS PLUG IS NOT REMOVED DURING REGULAR SERVICE. ONLY IF THE DIRECTION OF ROTATION IS BEING CHANGED IS THIS PLUG REMOVED TO SWITCH TO OPPOSITE HOLE TO KEEP ON DISCHARGE SIDE. (MOTORS AND BI-DIRECTIONAL PUMPS HAVE CHECK VALVES ON BOTH SIDES, INSTEAD OF A PLUG.)

   Check the drive shaft for burrs or sharp edges. If necessary, use a seal guide or tape to protect the seal lips. Grease the seal lips and shaft. Position flange assembly over drive gear and carefully slide drive gear through shaft seal and aligning with idler gear journal as flange slips into place. If flange stops approximately 1/8" from body face, the journal bearings in the flange may have caught the pressure balance seal strips. Do not force. Lift flange up and position seal strips away from the journal using a small screwdriver in the middle and ends until the flange drops into place without force. Do not drive the flange in with a hammer, or the seal strips may be cut.

7. Install washers and nuts (or bolts) finger tight. While holding the pump in a vise or other safe clamping device, torque the nuts/bolts with a torque wrench, using a cross pattern procedure, to specifications below:

   Pumps using 1/2-20 Nuts: 80-90 lb.-ft.

   Pumps using 5/8-18 Nuts: 160-170 lb.-ft.

8. After torquing the nuts/bolts, turn the drive shaft using a coupling and pipe wrench. The shaft will not turn freely by hand, but should turn within a torque not exceeding 20-30 lb.-ft. per section. Turn the shaft at least two turns. If the shaft cannot be turned by the above procedure, disassemble pump and check for top and bottom pressure plates assembled in reverse positions, pinched pressure balance seal strips, or gear teeth caught on burrs around port hole (if new body was installed). Reassemble and repeat steps 7 & 8.

9. It is recommended that all rebuilt pumps be tested on a test bench before field installation. This is especially true if new housings are installed and proper break-in procedures required.

Shaft Seal Replacement Procedure

1. Lay flange on a clean surface with pilot face down. With a 1/4" punch, or screwdriver with tip bent, insert through drive bearing and inner seal, until against edge of outer seal case. Tap at 3 locations around seal case, driving seal out of bore. Be careful not to score bore.
2. Turn flange over with pilot face up, and remove snap ring.
3. Turn flange back over with pilot face down and remove inner seal with same procedure in step 1.
4. Wash bore with solvent and check for scratches or burrs.
5. Coat seal O.D. and flange bore with light coat of sealant (Aviation Form-A-Gasket MIL-S-45180C Type III) PERMATEX No. 3, or equivalent.
6. Press inner seal just past snap ring groove with a hydraulic, or arbor press. The seal lip containing the garter spring must face towards inside of pump. Use a seal pusher, or socket with O.D. slightly smaller than seal O.D. to keep seal perpendicular to seal bore while pressing.
7. Install snap ring.
8. Re-coat bore and outer seal with thin layer of sealant and press in to snap ring. Again, the seal lip with garter spring should be turned towards inside of pump.
9. Install new "weep-hole" plug in 3/16" drilled hole at outer surface of flange.

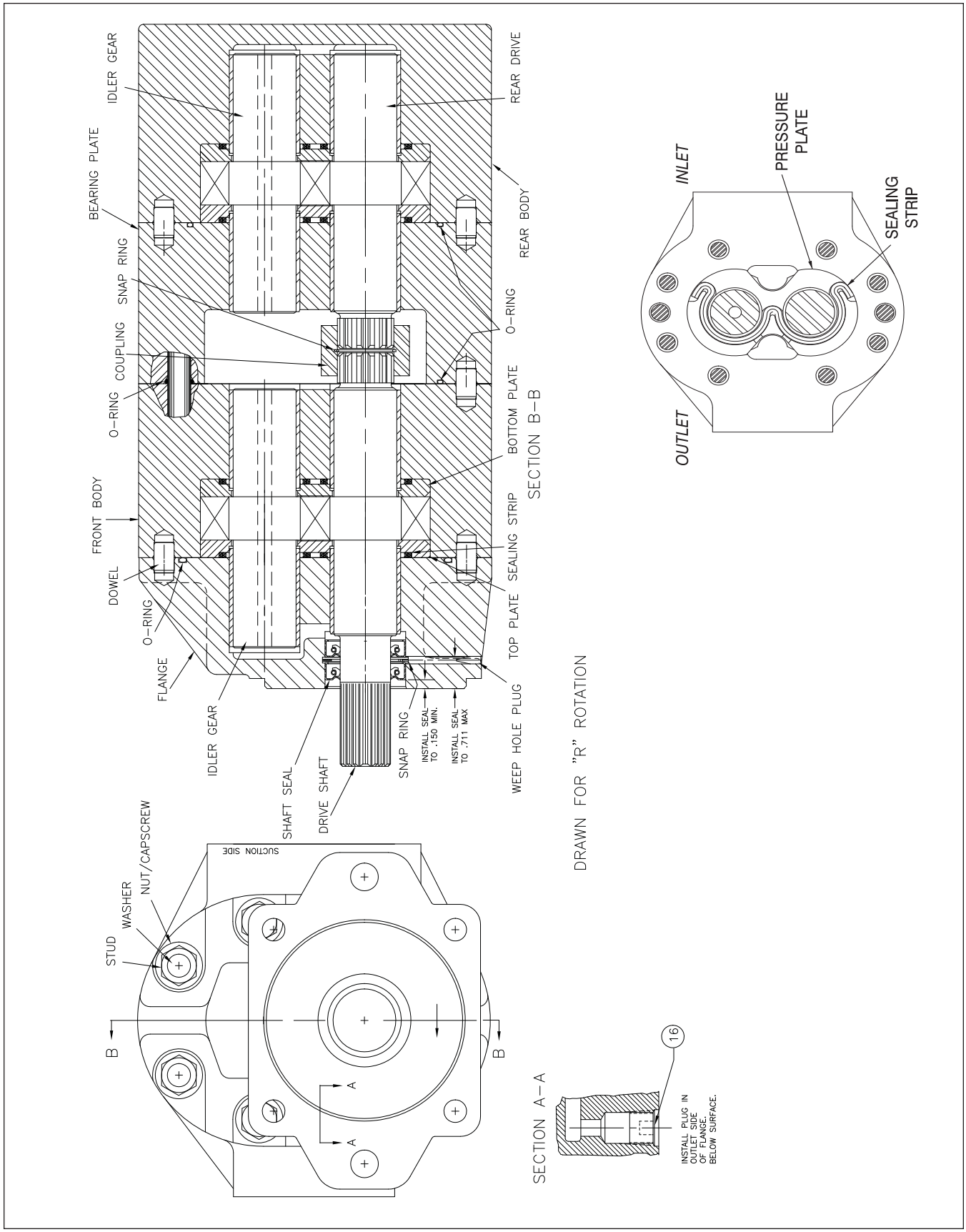

Figure 1-1: Typical Multiple-Section Pump Cross-Section

Troubleshooting Guide For GearTek Hydraulic Pumps

IDENTIFICATION	CAUSE	CORRECTIVE CHECKS
• Sandblasted band around pressure plate bores • Angle groove on face of pressure plate • Lube groove enlarged and edges rounded • Dull area on shaft at root of tooth • Dull finish on shaft in bearing area • Sandblasted gear bore in housing	Abrasive wear caused by dirt or other fine contaminants not visible to the eye	• Was clean oil used? • Was filter element change period correct? • Were correct filter elements used? • Cylinder rod wipers in good condition? • Cylinder rods dented or scored? • Was system flushed properly after previous failure?
• Scored pressure plates • Scored shafts • Scored gear bore	Abrasive wear caused by metal particles or other coarse contaminants visible to the eye	• Was system flushed properly after previous failure? • Contaminants generated elsewhere in hydraulic system? • Contaminants generated by wearing pump components?
• Any external damage to pump • Damage on rear end of drive gear and rear pressure plate only	Incorrect Installation	• Did shaft bottom out in mating part? • Any interference between pump and machine?
• Eroded pump housing • Eroded pressure plates	Aerated oil or restricted oil flow to pump inlet causing Cavitation	• Tank oil level correct? • Oil viscosity as recommended? • Restriction in pump inlet line? • Air leak in pump inlet line? • Loose hose or tube connection near or above oil level in tank? • Excessive operation of relief valve?
• Heavy wear on pressure plate • Heavy wear on end of gear	Lack of oil	• Was oil level correct? • Any leaks in piping inside tank? • Any oil returning above oil level?
• Housing scored heavily • Inlet peened and battered • Foreign object caught in gear teeth	Damage caused by metal object	• Metal object left in system during initial assembly or previous repair? • Metal object generated by another failure in system?
• Pressure plate black • O-Rings and seals brittle • Gear and journals black	Excessive heat	• Was a valve stuck? • Was relief valve too low? • Was oil viscosity correct? • Was oil level correct?
• Broken shaft • Broken housing or flange	Overpressure	• Relief valve setting correct? • Did relief valve function?

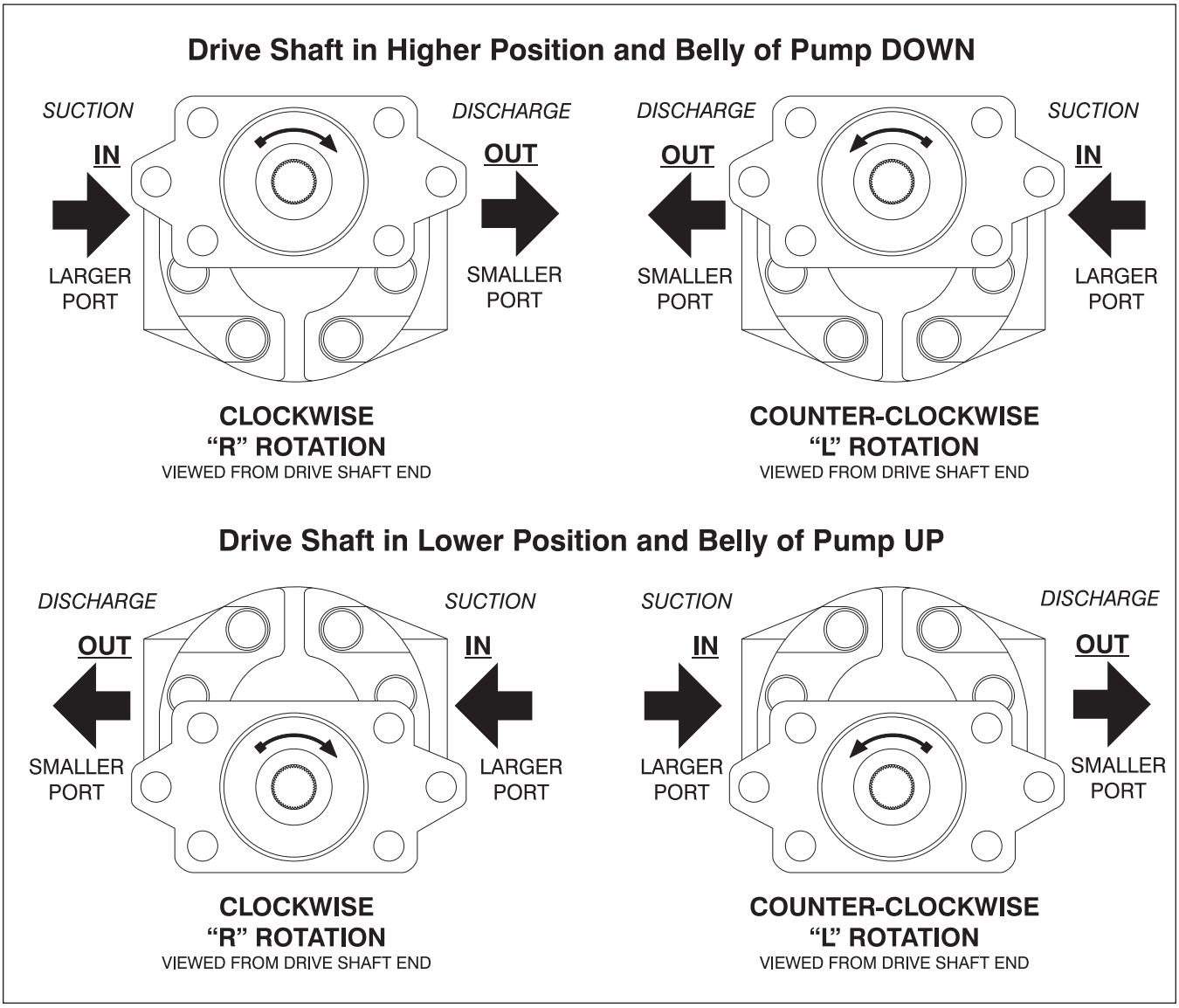

Figure 1-2: Direction of Rotation and Location of Suction and Discharge Ports