ASSEMBLY

When this manual refers to a part number, it refers to the included Parts List.

The hydraulic motor is preassembled and ready for installation. There are a range of optional cylindrical shafts available at Princess Auto Ltd. if the job requires a different range of gear ratios or shaft lengths. Changing the shaft requires the user to disassemble the motor.

PREPARING THE AREA

Clean the work area until it is free of debris and dust before diassembling the motor. Contaminates can adhere to oil coating the parts and may damage the mechanism. Have a clean container ready to place the parts during the disassembly process.

TOOLS REQUIRED

- 1/2 in. Wrench or Socket
- 5/16 in. Allen Wrench
- 3/16 in. Allen Wrench
- Torque Wrench
- Vise, Bulldog or similar style
- Soft Jaws to protect the motor in vise. Pieces of hard rubber or wood boards can be used.
- Plastic hammer
- Welding torch or Heat gun capable of reaching a temperature of 500 °F (260 °C).
- Cyanoacrylate glue AKA instant glue
- Solvent (acetone or methylene chloride)
- Wire brush (to clean screws of glue)

DISASSEMBLE THE MOTOR

CAUTION! The motor is heavy. When placing the motor in the vise, support it from underneath until firmly clamped into place. Be careful not to pinch your fingers when closing the vise jaws.

These instructions are to disassemble the motor before placing into service. If the seals or the shaft are being swapped out after the motor has been in service, drain oil from the hydraulic circuit and clean the outer surface around the ports before disconnecting.

Do not separate seals, o-rings or washers from their parts when just replacing the shaft before initial service.

REMOVING SCREWS AND BOLTS

The screws are held in place with cyanoacrylate glue or instant glue. Heat the housing around the screws with a welding torch or heat gun for approximately 5 to 10 seconds. The glue will release at a temperature between 300 to 500 °F (149 to 260 °C). Remove heat as soon as the screw is loose to avoid damaging the motor.

Blow loose debris and glue from the screw holes with dry air. The set glue in the holes does not need to be removed, unless it interferes with the screws.

Remove the cyanoacrylate glue left in the screw threads with a combination of soaking the screws in acetone or methylene chloride and working with a wire brush. Leave to dry before reinserting into the housing.

Consult the manufacturer's instructions on curing time when reapplying the instant glue. Some instant glues can be combined with a curing agent that will decrease the curing time.

WARNING! Follow the manufacturer's Material Safety Data Sheet instructions before handling cyanoacrylate glue, acetone or methylene chloride. Avoid inhaling or coming in contact with all three. Become familiar with first aid/medical instructions before using the glue or solvents.

DISASSEMBLY

A plastic hammer may be required to loosen some parts after the motor has been in service.

1. Remove the Woodruff Key (#10) by hand.
2. Clean the motor's exterior of oil and debris. Ensure both Plugs (#17) are still in place during cleaning.
3. Place the geroler motor in a vise with the flange face down. Close the vise on either side of the flange. The vice should have soft jaws or a protective material between the motor and jaws.
4. Remove the Inlet and Outlet Plugs (#17). Loosen with a 1/2 in. wrench, then complete removal by hand.
5. Remove the Drain Plug (#29) with a 3/16 in. Allen wrench.
6. Remove the End Cover (#25) by loosening all Screws (#27) with a 1/2 in. wrench. Complete screw removal by hand.
7. Remove the geroler set as one unit. Do not separate the Stator (#22), Roller (#23) and Rotor (#24) while removing them. Put aside as a single unit.

8. Remove the Drive Link (#21).
9. Remove the Distributor Plate (#20).
10. Remove the Axial Needle Bearing (#8) on the bottom of the Shaft (#9).
11. Hold the motor from underneath and loosen the vise.
12. Turn motor with the flange facing upward and position so vise clamps on either side of the inlet and outlet ports. Tighten the vice to secure. Do not clamp across the housing as pressure can distort the housing shape.
13. Use 5/16 in. Allen head spanner to remove the Flange Screws (#1).
14. Remove the Front Cover (#4). This will contain the Dust Seal (#3) and Shaft Seal (#5).
15. Remove the second Axial Needle Bearing (#8) and Shaft (#9).
16. Remove both Check Valves (#12) and Balls (#13) from the Housing.

CLEANING AND PREPARING COMPONENTS

1. Check all mating surfaces for scratches and burrs that may leave openings that will allow leaks. Replace any damaged part.
2. Clean parts in a compatible solvent and blow dry with air. Do not use paper or fabric cloth to dry as fibers left behind could damage the hydraulic system.

NOTICE! Ketone based solvents like acetone or methylene chloride can ruin Viton seals. Take precautions to keep the solvents from coming into contact with the seals. Should contact occur, replace the seal even if there does not appear to be any damage to prevent the possibility of leaks under pressure.

3. Check areas that will contact the seals during reassembly for burrs or sharp edges. Remove nicks and burrs with a stone made of novaculite (also called Arkansas stone). Do not use a file or grinder to remove the edges.
4. Lubricate all mating surfaces with grease or petroleum jelly as they are being reassembled.
5. Replace the shaft before replacing the seals and o-rings.

REPLACING THE SHAFT

1. Mark the rear end of shaft to identify the location of a commutation slot (see B in Fig. 3). This will be required later to set the shaft rotation.
2. Apply petroleum jelly or lubricant to the shaft.
3. Insert the shaft's base into the Housing (#15) without forcing it in. Once the wide part of the shaft is positioned, gently tap the shaft's end with your fingers until it slides into place. Once it has slid into place, push down to seat the shaft.
4. Go to section Rebuild the Motor or Replacing the Seals

REPLACING THE SEALS

After a period of use, the worn rubber and plastic components should be replaced. Princess Auto Ltd. has a Viton seal kit for this motor. Lubricate all seals with grease or petroleum jelly before placing. A clean plastic hammer may be required to tap the seals into place.

1. Fit the replacement O-ring (#19) in the groove of the geroler set between the Geroler set (#22, #23, #24) and the End Cover (#25).
2. Fit the replacement O-ring (#19) in the groove on the Distributor Plate (#20).
3. Fit the replacement O-ring (#19) into the groove on the posterior end of the Housing (#15).
3. Fit the replacement O-ring (#7) between the Thrust Washer (#6) and Axial Needle Bearing (#8).
4. Remove and replace the Shaft Seal (#5) from the Front Cover (#4). Access the seal from the rear of the front cover.
5. Remove and replace the Dust Seal (#3) from the front.
6. Replace the O-ring (#11) on each end of both Check Valves (#12).
7. Go to the Rebuild the Motor section.

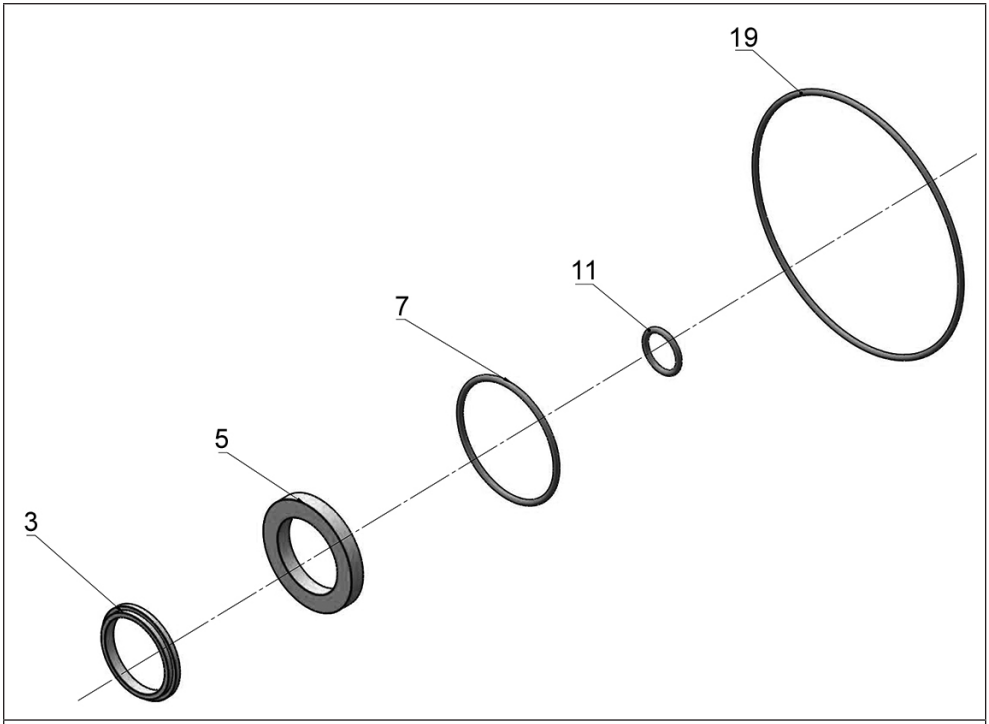


Fig.2

REBUILD THE MOTOR

1. Place Balls (#13) in Check Valve (#12). Close up after the sealing surface has been stamped.
2. Begin with the flange facing upward with the shaft in place. Clamp the vise on either side of the inlet and outlet ports until tight.
3. Place an Axial Needle Bearing (#8) onto the shaft.
4. Place an O-ring (#7) onto the axial needle bearing.
5. Place the Thrust Washer (#6) onto the o-ring and press down gently to seat.
6. Place the Front Cover (#4) over the shaft and press into position on the Housing (#15).
7. Apply a small amount of instant glue to the end of each screw before reinserting through the front cover into the housing.
8. Tighten the screws in increments with a torque wrench equipped with an Allen head adapter until they are between 398 and 442 in-lb. Alternate between screws so an even pressure is applied to the seals and o-rings. Wipe off any residue with one of the solvents mentioned earlier.

9. Hold the motor housing from underneath and release from the vise. Flip over so the rear opening is up. Again clamp on the flange so as not to distort the housing.
10. Align the mark for the commutation slot (B) with hole C in the housing (see Fig. 3).
    10.1 Also place a mark on the outer housing to assist in aligning for later steps.
11. Push down on the base of the shaft to firmly seat it against the front cover seal.
12. Place the Axial Needle Bearing (#8) in the space created by step 11.
13. Place the O-ring (#19) it in the housing seal groove. Tap into place with the clean plastic hammer if needed.
14. Place the Distributor Plate (#20) and Drive Link (#21) in the internal spline of the Shaft (#9).
    14.1 Align the gear teeth of the rotor (A) and the Drive Link (#21) with the mark on the housing, then put them into the Housing (#15). The drive link will rotate clockwise.
15. Place the End Cover (#25) over the gear wheel set and turn it to align the screw holes.
16. Install the Washers (#26) and fasten the Screws (#27) using a hexagon socket and 354 to 398 in-lb of torque.
17. Install the Washer (#28) and fasten the Plug (#29) using a hexagon socket and 221 to 265 in-lb of torque.
18. Press the Woodruff Key (#10) into the key slot using a plastic hammer.

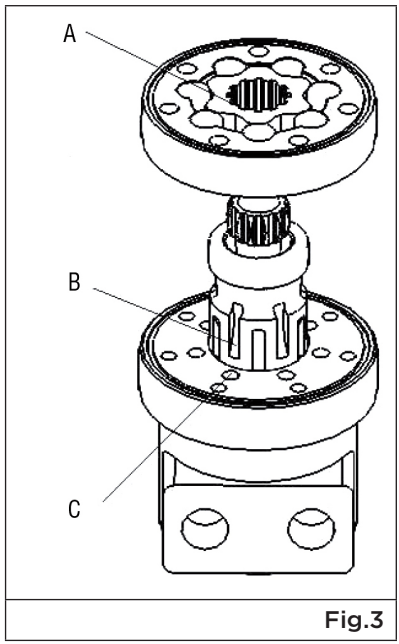
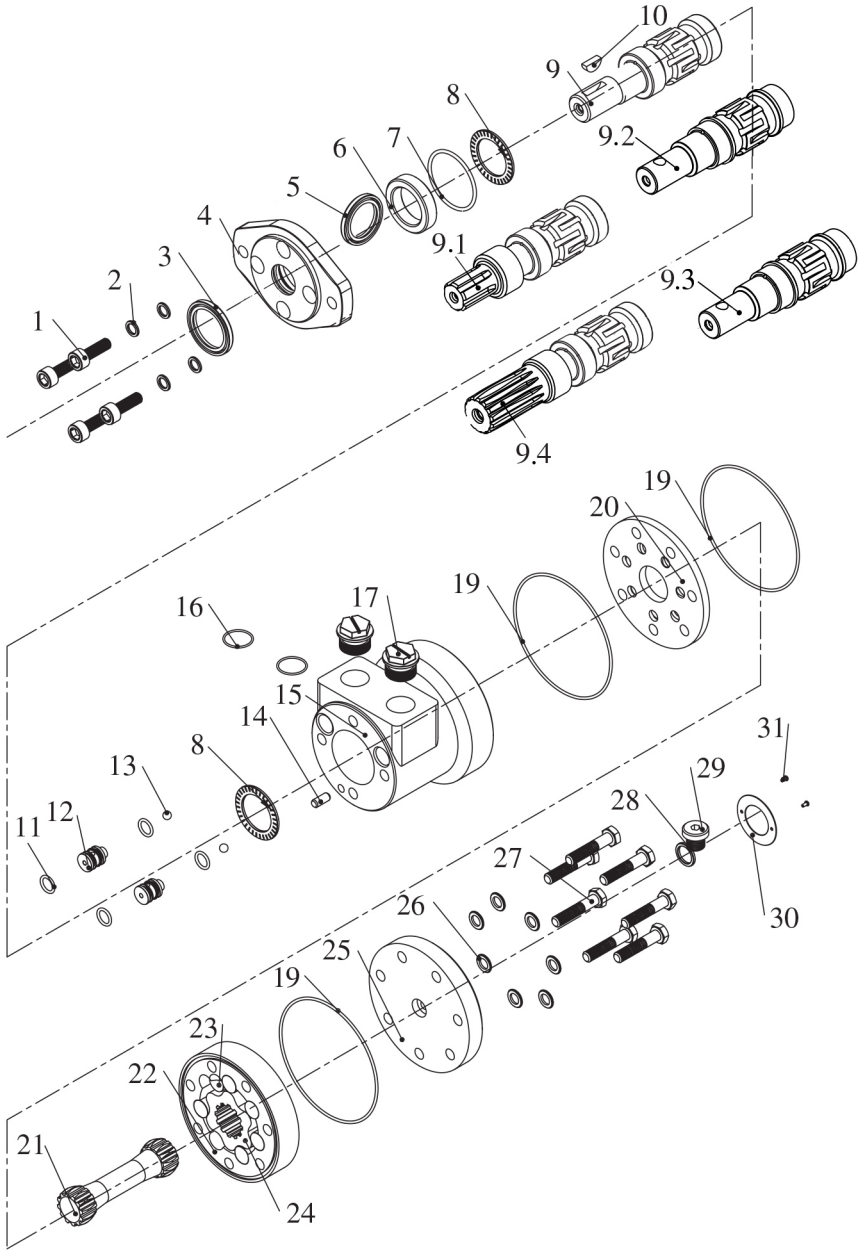


Fig.3

PARTS BREAKDOWN



PARTS LIST

PARTS#	DESCRIPTION	QTY
1	Screw	4
2	Washer	4
3	Dust Seal	1
4	Front Cover (H2 Flange)	1
5	Shaft Seal	1
6	Thrust Washer	1
7	O-ring	1
8	Axial Needle Bearing	2
9	Shaft - Replacement (8490898)	1
9.1	Shaft - 6 Spline (8490906)	1
9.2	Shaft .315 Crosshole (8490948)	1
9.3	Shaft .406 Crosshole (8490930)	1
9.4	Shaft 13-Spline (8490914)	1
10	Woodruff Key	1
11	O-ring	4
12	Check Valve	2
13	Ball	2
14	Pin	1
15	Housing	1
16	O-ring	2
17	Plug	2
18	---	---
19	O-ring	3
20	Distributor Plate	1
21	Drive Link	1
22	Stator	1
23	Roller	7
24	Rotor	1
25	End Cover	1

PARTS#	DESCRIPTION	QTY
26	Washer	7
27	Screw	7
28	Washer	1
29	Drain Plug	1
30	Name Plate	1
31	Rivet	2