Hydraulic Motor - Seal Repair Kit

Kit No. 3430-0748
Hydraulic Motor Seal Kit

Form L-0376C
01/10

DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

For more detailed information on the repair procedures for Hypro Pumps, please refer to the Hypro operations manual that was shipped with your pump. If you do not have a copy of this form and would like to get one, please visit our website at www.hypropumps.com.

Disassembly and Repair of the Hydraulic Motor

IMPORTANT: The work area and motor should be as clean as possible to prevent contamination of parts.

1. Place the hydraulic motor in the vise.
2. Remove the tank port adapter and pressure port adapter with a large crescent wrench.
3. Using a 9/16" box end wrench, loosen the nut on the bypass adjusting screw.
4. Using a small screwdriver, remove the bypass adjusting screw from the motor. (This will remove the screw, nut, washer and thread-seal gasket.)
5. Using a 1/4" allen wrench, remove the socket head bolts from the motor end plate.
6. If motor end plate will not lift off easily, use a small screwdriver to carefully pry apart the boss portion of the end plate and gerotor housing until free.
7. Remove both parts of the gerotor.
8. Remove the roll pin from the shaft.
9. Remove the O-ring from the motor end plate and body with a flat instrument such as a knife blade.
10. Inspect the motor end plate, body and gerotor housing for wear and/or gouging. If gouging has occurred in the motor end plate, body or gerotor housing, the part that is worn must be replaced. If gerotor housing is damaged, gerotor parts must also be replaced.
11. While the motor is completely disassembled, clean all parts in a solvent bath.

To Remove the Shaft Assembly from the Motor

1. Remove the slinger ring from the motor shaft.
2. Using the large retaining ring pliers, remove the retaining ring next to the ball bearing in the motor body.
3. Place the body in the support fixture and position on arbor press. The threaded portion of the shaft should be inside the fixture. Press out shaft assembly with arbor press.

Hydraulic Motor Shaft Disassembly and Repair

1. Remove a large snap ring from shaft with a screwdriver. Remove thrust bearing assembly from shaft (includes the thrust bearing and two thrust bearing races) and the seal spacer.
2. Remove the small snap ring next to the shaft ball bearing.
3. To remove the bearing from the shaft, place the shaft (threaded end up) in the pipe support fixture. Place the two support bars (provided in the tool kit) opposite each other and between the seal on the shaft and the support fixture. Using an arbor press, press the shaft through the bearing, seal spacer and seal.
4. Inspect the sealing area of the shaft for wear. Inspect other shaft assembly components for wear, and replace if necessary.

Build Shaft Sub-Assembly

First, determine the hydraulic seal type that the motor you're rebuilding was manufactured with. (Hydraulic seal type was changed on 1-1-2010.) There are several visual, physical characteristics on the outside of the motor body to help identify which hydraulic seal type it was manufactured with.

Important: This kit contains several parts that are meant exclusively for upgrading the old seal-type motors to the new type seal. Please read the instructions carefully and identify which motor type you're working with before starting the assembly process.

Note: See page 2 for assembly instructions of shaft sub-assemblies.

Install Shaft Sub-Assembly Into Motor Body

Important: Make sure the surface edge of the arbor press fixture is smooth and clean. An unthreaded piece of pipe (1" x 4" high) is needed to support the outer race of the seal cartridge sub-assembly and outer race of the ball bearing during assembly. Place this pipe over the shaft threaded end for assembly of the following steps.

1. Place the body on a support fixture in the arbor press. Using an unthreaded piece of pipe (1" dia. x 4" high), press the shaft sub assembly down into the body until it bottoms out. This is a light press fit and should be done slow and easy.
2. Install the new ball bearing onto the threaded end of the shaft. Press down using the 1" x 4" pipe until the retaining ring can be installed in its groove in the bearing core of the motor body. Install the retaining ring.
3. Turn the motor body assembly over (threaded shaft end down) on the arbor press. Press the shaft down into its "final position" until the small retaining ring can be installed in the shaft next to the ball bearing.
4. Install small retaining ring on shaft.
5. Check shaft rotation at this point. It should rotate smoothly with only slight resistance from the seal lip pressure on the shaft. If you feel any gritty or sticking movement, return assembly to the arbor press and lightly press on the threaded end of the shaft to relieve press fit compression on the thrust bearing. **Note:** Don't over do this press. The objective is to move the small outer retaining ring installed in the previous step back to " touching only" the ball bearing inner race.

Important: If gritty or sticky movement persists, it's likely due to re-used parts or the body needle bearing is in need of replacement.

Reassembly of Remaining Hydraulic Motor Parts

1. Place the motor body in a vise with large end of the shaft facing up.
2. Install the o-ring in the body.
3. Install the roll pin on the shaft. Place the inner gear of the gerotor onto the shaft, making sure gerotor slot lines up with the key in the shaft.
4. Install the outer portion of the gerotor, making sure the gerotor is centered within the o-ring groove on the body.
5. Install the gerotor housing, making sure the pins in the gerotor housing line up with their respective holes in the body.
6. Lightly lubricate the area between the inner and outer gerotor and the outer gerotor and gerotor housing with hydraulic oil or mineral oil.
7. Install the o-ring on the motor end plate.
8. Place end plate on gerotor housing, making sure holes in end plate line up with pins in the gerotor housing.
9. Install four socket head bolts in motor end plate. Using a 1/4" allen wrench, tighten bolts in a crisscross pattern to approximately 15 foot pounds of torque.
10. Install the thread seal gasket on the bypass adjusting screw. Put the gasket on from the slotted end, and turn until four threads on the screw are showing. Install the washer and the nut. Install the bypass adjusting screw in the motor end plate.

A. For closed center hydraulic systems, turn the bypass adjusting screw in until it bottoms out in the end plate. Tighten nut down with 9/16" box end wrench.

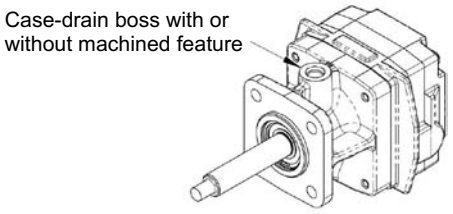
B. For open center hydraulic systems, turn the bypass adjusting screw in until it bottoms out in the end plate; then turn back out 1-1/2 full turns. Holding the bypass adjusting screw with a screwdriver, tighten nut. (Motor will then have to be readjusted to tractor system.)

11. Replace the o-ring in both port adapters.
12. Install the pressure port adapter and tank port adapter back onto the motor. Do not over tighten port adapters.
13. Remove the hydraulic motor from the vise. Turn the shaft by hand to check for binding.
14. Install the slinger ring over motor shaft.
15. Install the motor into pump mounting flange. Insert four hex head bolts and tighten securely.

Assembly Instruction for New Seal-Type Motors

New Seal Type

Case-drain casting boss is present (with or without case drain port) only on motors manufactured with “new” type hydraulic seal.



1. To assemble the seal cartridge, remove the old seal from the cartridge by pressing it out. The cartridge is reused by assembling the new seal into cartridge, ensuring the new seal is pressed in with the lip seal on the opposite side as shown in Fig.1.

Note: To prevent damage to the seal lip extending out, use seal spacer as shown to guard lip during assembly.

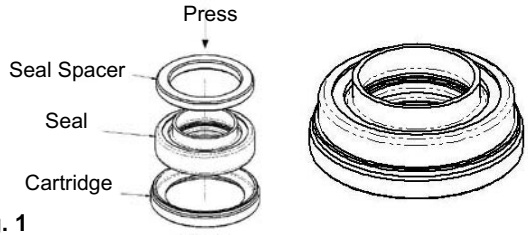


Fig. 1

2. Install the large retaining ring onto large diameter end of shaft.
3. From the small, threaded end of the shaft, install the following parts in this order: thrust bearing race, thrust bearing, 2nd thrust bearing race.

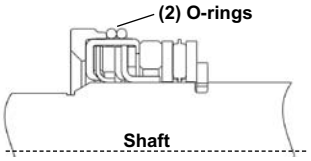
Note: The thrust bearing and races should not be reused if they are showing any signs of wear.

4. Install new type seal spacer (looks like a thick washer, approx .130 inch thick.)
5. Before installing the new seal, its lip must be expanded to fit on the shaft. With the seal lip facing out, slide the seal over the threaded end of the shaft and gently push the seal onto the raised area of the shaft. Do not push the seal past the large retaining ring groove on the shaft.
6. Once the seal has been expanded, remove the seal from the shaft.
7. Install seal cartridge assembly: With seal lip facing the large end of the shaft, slide the seal cartridge assembly over the threaded end of the shaft and gently push into the raised area of the shaft. Align the seal lip to enter the center diameter of the seal spacer and push until seal body touches seal spacer.

Note: If the seal lip is longer than the seal spacer’s width, please stop the assembly and review parts being used.

8. Assemble two o-rings on the outside body of the new seal cartridge assembly as shown in Fig 2. Install o-rings one at a time and do not roll over each other.

Fig. 2



9. Finished shaft sub-assembly should look like this:



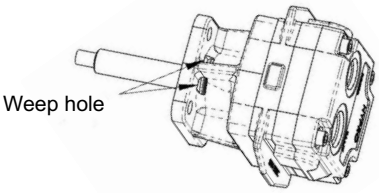
10. Do not press, but place the shaft sub-assembly into the motor body with threaded end of shaft up. Lubricate the two o-rings with hydraulic or mineral oil before assembling.

Note: Return to page 1, second column, to complete the motor assembly.

Assembly Instruction for Old Seal-Type Motors

Old Seal Type

Weep hole is present only on motors manufactured with “old” type hydraulic seal.



1. Install the large retaining ring onto large diameter end of shaft.
2. From the small threaded end of the shaft, install the following parts in this order: thrust bearing race, thrust bearing, 2nd thrust bearing race.

Note: The thrust bearing and races should not be reused if they are showing any signs of wear.

3. Install new type seal spacer provided in kit. Discard old spacer from the disassembly. (New type seal spacer looks like a thick washer, approx .130 inch thick).
4. Before installing the new seal, its lip must be expanded to fit on the shaft. With the seal lip facing out, slide the seal over the threaded end of the shaft and gently push the seal onto the raised area of the shaft. Do not push the seal past the large retaining ring groove on the shaft.
5. Once the seal has been expanded, remove the seal from the shaft.
6. Install new type seal with seal lip facing the large end of the shaft. Slide the seal over the threaded end of the shaft and gently push onto the raised area of the shaft. Align the seal lip to enter the center diameter of the seal spacer and push until seal body touches seal spacer.

Note: If the seal lip is longer than the seal spacer’s width, please stop the assembly and review parts being used.

7. Apply a small bead of sealant on outside of the seal body as shown (Permatex® Form-A-Gasket® No. 2 or Permatex® Gasket Sealant & Dressing No. 09974).



8. Identify new type front spacer provided in kit used only on old type motors. Discard old front spacer from the disassembly. (New type front spacer looks like a thick washer with a counter bore on one side, approx .164 inch thick).
9. Install new type front spacer by locating the counter bore side. Face this counter bore towards the seal, and slide spacer onto small end of shaft until the counter bore fits onto the seal body.
10. Finished shaft sub-assembly should look like this:



11. Do not press, but place the shaft sub-assembly into the motor body with threaded end of shaft up, taking care not to dislodge the front spacer out of its assembled place.

Note: Return to page 1, second column, to complete the motor assembly.

Pentair Water
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HYPRO® Centrifugal Pump Seal Repair Kit

Form L-0374C 12/10

Kit No. 3430-0589
Seal kit for Series 9200, 9300 and 9400 cast iron and stainless steel centrifugal pumps. Silicon carbide seal.

Kit No. 3430-0590
Seal kit for Series 9000P polypropylene centrifugal pump. Silicon carbide seal.

Kit No. 3430-0591
Seal kit for Series 9000 cast iron centrifugal pump. Silicon carbide seal.

Kit No. 3430-0593
Seal kit for Series 9300P, 9400P and 9500P polypropylene centrifugal pumps. Silicon carbide seal.

GENERAL SAFETY INFORMATION

1. **WARNING: DO NOT PUMP FLAMMABLE OR EXPLOSIVE FLUIDS SUCH AS GASOLINE, FUEL OIL, KEROSENE, ETC. DO NOT USE IN EXPLOSIVE ATMOSPHERES. COMPONENTS NOT RATED FOR USE WITH ANHYDROUS AMMONIA. THE PUMP SHOULD BE USED ONLY WITH LIQUIDS COMPATIBLE WITH THE PUMP COMPONENT MATERIALS. FAILURE TO FOLLOW THIS WARNING CAN RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE AND WILL VOID THE PRODUCT WARRANTY.**
2. Be sure all exposed moving parts, such as PTO shafts and adapters, are properly shielded or guarded and that all coupling devices are securely attached before applying power.
3. Pumps mounted directly onto PTO shaft or other power shaft must be prevented from rotating with the power shaft. Pump must float freely on the power shaft and must not be tied rigidly to equipment on which it is mounted.
4. **DO NOT EXCEED** recommended speed, pressure and temperature for pump and equipment being used.
5. **BEFORE SERVICING**, disconnect all power. Make sure all pressure in the system is relieved. Drain all liquids from the system and flush.
6. Secure the discharge lines before starting the pump. An unsecured line may whip, causing personal injury and/or property damage.
7. Check hose for weak or worn condition before each use. Make certain that all connections are tight and secure.
8. Periodically inspect the pump and the system components. Perform routine maintenance as required.
9. Protect pump from freezing conditions by draining liquid and pumping rust inhibiting antifreeze solution through the system, coating the pump interior.
10. Use only pipe, hose and fittings rated for the maximum PSI rating of the pump.

For more detailed information on the repair procedures for Hypro Centrifugal Pumps, please refer to Hypro Form Nos. L-0300AG, L-0310C, or L-1526 that was shipped with your pump. If you do not have a copy of these forms and would like to get one, please call your local dealer or Hypro at (651) 766-6300 and ask for the Customer Service Representative for your area.

DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

Always flush pump with water or neutralizing agent before servicing.

Disassembly

In most cases, seal replacement requires disassembly of only the pump half of the unit.

NOTE: Instructions following in *[italics]* describe procedures for the polypropylene centrifugal pumps when different than the cast iron pumps.

1. Remove the four casing cap screws with 9/16" box end wrench. Tap pump casing on discharge port with rubber hammer, if necessary, to break loose from mounting flange. Check inside of pump casing including suction port. If badly eroded [or damaged], pump casing should be replaced. Remove o-ring and discard. O-ring should always be replaced. *[Using a 1/2" wrench, remove the six bolts from the front. Also remove the 5/16" screw from the rear near the outlet port].*
2. To remove the impeller nut, clamp the flange in a vise and insert a large screwdriver or file (at least 10" long) into impeller vanes to prevent impeller from turning when loosening nut. Use a socket wrench (3/4" for Series 9000C or 5/8" for Series 9200C and 9400C) to remove the impeller nut by turning it counterclockwise. *[Use 7/8" deep socket wrench to remove plastic seal nut, then 9/16" deep socket to remove metal jam nut, rubber gasket and washer].*
3. Once nut *[and washer]* is removed, place a screwdriver on each side behind the impeller and pry away from the mounting flange. Remove key from the shaft. Remove o-ring from the mounting flange.
4. Using two screwdrivers positioned opposite each other, pry the rotary portion of the seal from the shaft.
5. *[Remove plastic back cover flange. Knock seal out from back with a hammer and screwdriver].*
6. Remove stationary seat and boot by prying out with two small screwdrivers in manner similar to impeller removal. If the pump is equipped with a silicon carbide seal, it may be

necessary to destroy the stationary seal seat with a punch or chisel for removal. Silicon carbide material is very brittle and will crack easily. **(Caution: The seal will be damaged from removal. A new seal MUST be used when pump is reassembled).**

7. Use a circular bottle-type wire brush to clean the pump ports and seal areas. It is also recommended that the pump casing and mounting flange be further cleaned in a solvent tank to remove rust and corrosion particles. *[Do not wire brush seal bore and ports on poly models].*

Assembly

Be extremely careful with the new seal. Silicon carbide material is very hard, but also very brittle. If the seal is accidentally dropped and hits a hard surface, the seal's primary ring (rotary part) and mating ring (stationary seal seat) can be damaged. Also take precautions not to introduce dirt or grit to the seal surfaces.

1. Inspect seal seat cavity to be sure it is clean and without debris. Foreign material at the bottom of the seal seat bore can cause the mating ring to be slightly cocked. The primary ring running on a cocked mating ring at 4500 RPM will chatter and shorten its seal life.

IMPORTANT: Make sure seal cavity is clean and lubricated.

2. Lubricate mating ring and seal seat cavity in mounting flange with detergent or lubricant for rubber to aid in smooth installation of mating ring.

   Install mating ring in casting with o-ring face down.

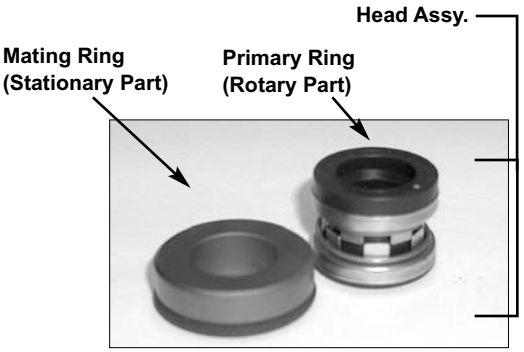
3. Press mating ring into seal cavity using a nylon or soft tool using uniform hand force. Seal will pop into place and bottom out once o-ring has slipped inside the leading edge of the seal seat cavity.
4. Next, place head assembly on shaft with primary ring (rotary part) positioned toward the mating ring. Slide the head assembly towards the mating ring until it bottoms out against the mating ring.

IMPORTANT: Do not lubricate shaft prior to installation of the rotary seal.

5. Do not re-install the rubber gasket (P/N 1700-0100) that was used with the 2120-0009 and 2120-0032 seal if your pump was originally equipped with one. The silicon carbide seal in this kit does not require a gasket. Re-installing the gasket will over compress the new seal causing damage.

IMPORTANT: Observe lettering on back side of the seal head and a green dot indicating viton material. This surface is seated against the impeller and provides positive engagement with the shaft. Reversing the seal head assembly will result in seal failure.

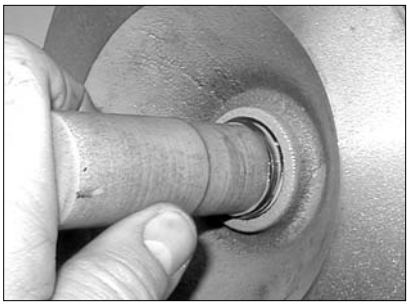
6. Insert key into shaft slot. Place impeller on shaft. Put impeller acorn nut *[washer, jam nut and gasket on poly pumps]* on shaft end, and using a screwdriver or file inserted into impeller vanes for support, tighten impeller nut securely.
7. Install o-ring on mounting flange. Replace o-ring if worn or damaged.
8. Place pump casing cover on mounting flange, insert and tighten bolts evenly.



Silicon Carbide Mechanical Seal: Viton, 5/8" Diameter



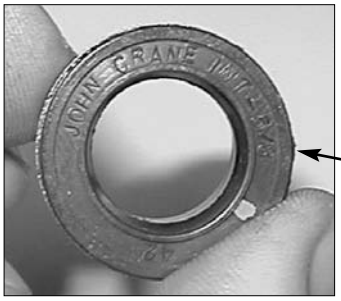
Step 2



Step 3



Step 4



This side mates against the impeller.

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