

Maintenance Instructions

It is advisable to periodically inspect your Parallel Shaft Reducer for any signs of impending service. Spare or replacement parts can often be ordered and obtained before disassembly is necessary, thus minimizing machine down-time. The following symptoms can be inspected visually without disassembly and may, in some cases, indicate extensive maintenance procedures.

Oil leaking from caps, cap screws or pipe plugs — Might be corrected by retightening or removal and recoating with Loctite® or pipe sealant before tightening. If this does not correct the leaking condition, disassembly will be necessary to replace 'o' rings.

High internal operating temperature (above 200°F.) — Could indicate that unit was being overloaded and should be replaced entirely with a larger capacity unit. Damaged bearings or inadequate oil level can also cause heat build-up.

Oil leaking from seals — Indicates that shaft and/or seals are worn and need replacing. Keep dirt and foreign particles off shafts in the area of the seals to minimize wear. Note: On initial run of new unit or after a replacement of seals, some lubricant leakage is normal for the first few hours of running time until seals seat against the shafts. If condition persists, seal replacement will be necessary.

Excessive end play of shafts — If there is a noticeable (.005" or more measurable) shaft movement when couplings are removed and shaft is moved back and forth, it is an indication of bearing wear. Removing shims between caps and housing or between housing halves can usually correct the condition and avoid bearing replacement (except in Model 230 drives).

Excessive backlash — Indicates worn gears which may have to be replaced.

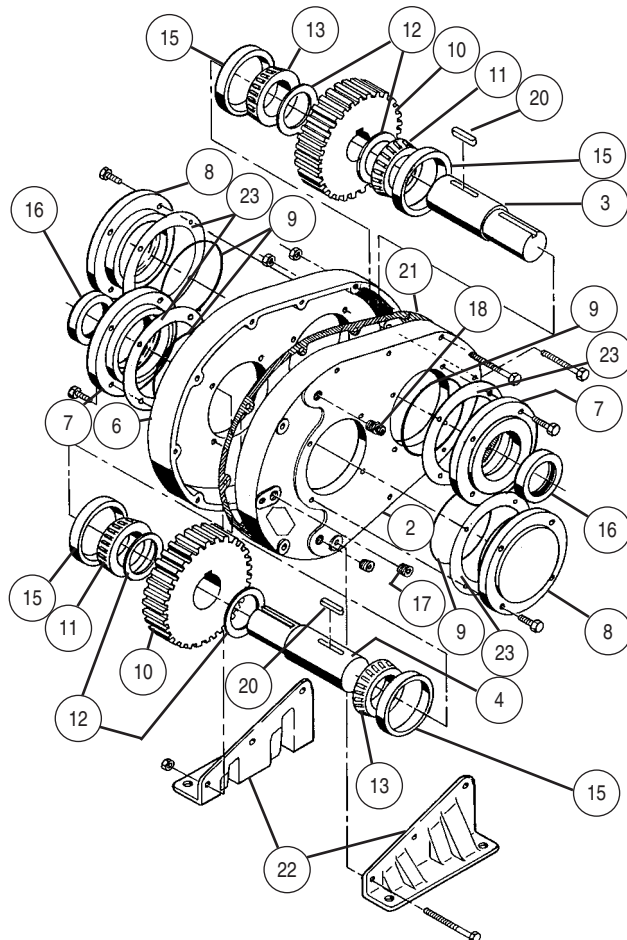


Figure 5 — Model 200 Parallel Shaft Reducer

IMPORTANT

In the initial factory assembly, Loctite® was used on the threads of all cap screws. If any screws are removed, a new application of Loctite® is necessary or lock washers must be installed. Note: Screw threads and threaded hole must be degreased before the application of Loctite®.

WARNING

For safe operation and to continue the unit warranty, when installing, reinstalling, or replacing a factory installed fastener for servicing purposes, or to accommodate the mounting guards, shields or other light load imposing devices, or for mounting the unit, it becomes the responsibility of the customer or user to properly determine the quality, grade of fastener, thread engagement, load carrying capacity, tightening torque, and the means of torque retention.

DISASSEMBLY PROCEDURE

CAUTION

The exterior threaded holes on this drive are for mounting the drive or drive accessories (couplings, sprockets, etc.). They are not to be used for lifting the drive or any driver/driven equipment.

WARNING

Make certain that the power supply is disconnected before attempting to service or install the unit, or remove any components. Lock out the power supply, and tag it to prevent unexpected application of power.

WARNING

Wear protective clothing and eye shields when installing or maintaining unit and machine.

Refer to Figures 5 and 6 unless otherwise noted.

1. Disconnect Parallel Shaft Reducer from drive motor, couplings or drive shaft to guard against personal injury. Remove all sprockets or sheaves from Reducer shafts with a puller tool to prevent accidental damage to shafts. Remove all keys from keyways.
2. Remove Pipe Plug (1) from Housing Half (2) and drain all lubricant from unit, preferably while unit is warm.

WARNING

Oil, housing, and other components can reach high temperatures during operation, and can cause severe burns. Use extreme care when removing lubrication plugs and vents while servicing the unit.

3. If old seals are to be salvaged, cover keyways with cellophane tape, plastic shim stock, or paper. Remove bolts and screws holding housing halves together. Carefully part housing halves and lift off one half of housing. Housing halves may be loosened by tapping with a rubber hammer but never pry with a screwdriver as damage to the housing may occur.
4. Carefully slip High Speed Shaft (3) assembly, Low Speed Shaft (4) assembly and Intermediate Shaft (5) assemblies (double reduction units only) out of remaining Housing Half (6). Avoid damaging gear teeth or contaminating bearing surfaces with grit or abrasive particles.
5. Disassemble Open Caps (7), Closed Caps (8), and Shims (23) from Housing Halves (2) and (6) by removing four cap screws from each cap.
6. Disassemble all high speed, low speed and intermediate shafts that have tapered roller bearings as follows:
 - A. Place side of Gear (10) on anvil of a press with drive end of shaft up. Push shaft through Bearing Cone (11), Spacer (12) and gear. Remove key from shaft keyway only if it appears damaged and needs replacing.

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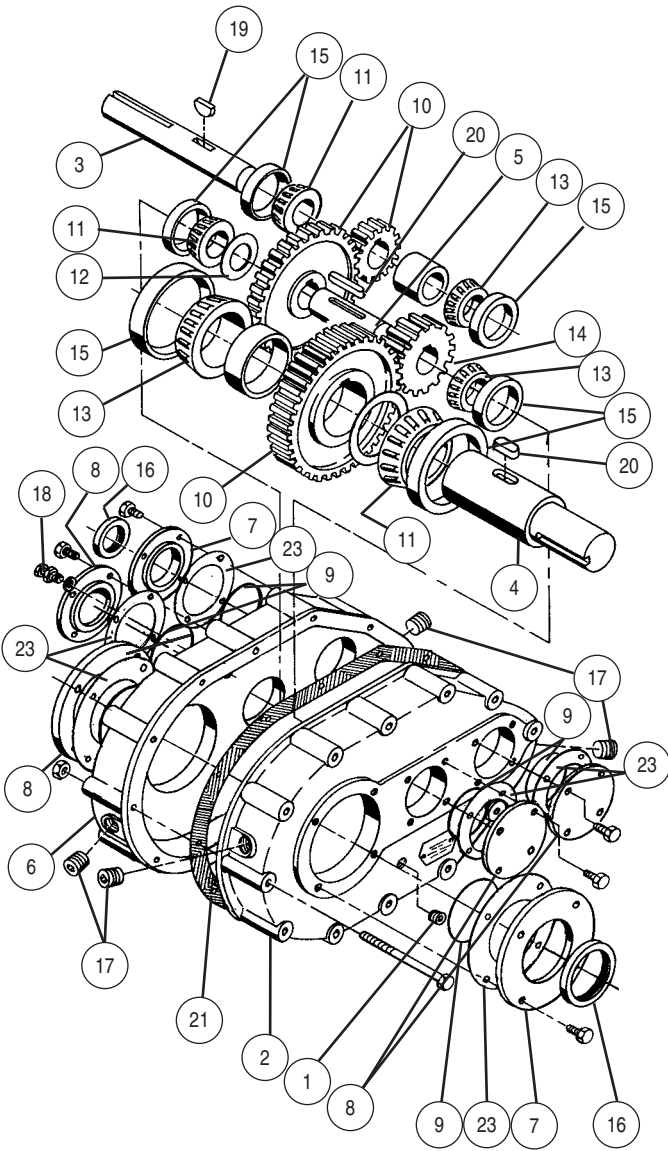


Figure 6 — Model 83L Parallel Reducer

NOTE: Gear and bearing cone of low speed shaft on Model 240 Reducer must be removed by removing cap screw and washer (not shown) and then pressing shoulder of shaft away from gear. Low speed shaft on Model 230 Reducer has no roller bearings and gear can be disassembled from shaft by removing snap rings (not shown) and pressing shaft through gear.

B. Press remaining Bearing Cones (13) from shafts by supporting inner bearing race on press anvil and pushing shaft through bearing. Note – On some Reducers, Pinion Gear (14) must be removed with Bearing Cone (13).

CAUTION

Do not attempt to strip both bearing cones and gear off a shaft at the same time as one bearing cone will lodge against the key under the gear.

7. On Model 230 Reducers (not shown), needle bearings and bearing races on high speed shaft may be removed quite easily but bronze bearings on low speed shaft must be pressed out of case halves along with seals.

8. If roller bearings are to be replaced, Bearing Cups (15) must be removed from caps or case halves with a puller tool so that no damage will occur to caps or case. If a puller is not available, it is possible to gently tap opposite sides of cup through hole in open caps to remove bearing cups.
9. Examine Seals (16) for wear or damage and remove from caps or housing only if replacement is necessary.
10. Remove Level Plugs (17) and Vent Plug (18) if your Reducer has them.
11. Inspect all other parts for damage or wear before proceeding to reassembly.

ASSEMBLY PROCEDURE

Important—If any gear is to be replaced, Hub City recommends that the complete gear set be replaced so that maximum life of replaced gear set may be obtained.

GENERAL INFORMATION

1. All parts including the gear case, should be cleaned thoroughly with an approved, non-flammable, non-toxic solvent. Any accumulation of sludge deposits or corrosion should be removed. Whenever caps are removed, it is recommended that seals, o-rings, shims and gaskets be replaced. These and other miscellaneous items are included in each Reducer Repair Kit (see Parts Lists).

Before starting reassembly, examine shafts for grooving in the shaft seal areas. If the shafts are to be reused, polish out any imperfections with a fine grade of emery cloth. The polishing motion should be circumferential, not axial or spiral in direction.

2. Press Bearing Cups (15) into Caps (7) and (8). Care must be taken to remove any foreign particles in cap counterbore so that cups will seat squarely. If cups must be tapped into place, use a rubber hammer or pieces of wood to protect cup surfaces. Do not insert seals at this time.
3. Reassemble parts in the proper order as shown in Figures 5 and 6. Be sure that all parts fit tightly together and no foreign material is included between them.

High and Low Speed Shaft Assemblies — Assembly of gears, spacers and bearings onto shafts is essentially the reverse of disassembly procedures previously described. However, certain precautions must be taken to insure proper assembly as follows:

1. Always start assembly by inserting Woodruff Keys (19) and Straight Keys (20) into shafts and then pressing shaft into gear. If more than usual resistance is encountered, heat gear in hot oil and then install on shaft where it will cool and shrink-fit. **IMPORTANT** — Always center gear over key so that when Bearing Cones (11) and (13) or Spacers (12) are installed on shaft they will butt against gear and not against key.

2. Never attempt to press more than one part on shaft at a time (as done when disassembling).

3. Keep press and work area as clean as possible to prevent new parts or reconditioned parts from being contaminated.

4. Always use insertion tool to install bearing cones. This tool may be obtained from Hub City or machined for that purpose in your shop. It is designed to support the bearing on the inner race so that it is not damaged. A substitute inserting tool may be made from tubing that has an I.D. sufficient to accept the shaft and an O.D. no larger than the inner bearing race.

CAUTION

Contact on the cage of the bearing or using the bearing cup to press the bearing on will damage bearing. If it is impossible to install the bearings as recommended above, the alternate method would be to heat the bearing (to temporarily increase I.D.) and gently tap opposite sides of bearing race with a flat punch without damaging bearing.

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FIGURE 7 – Seal Sleeve

FINAL ASSEMBLY AND BEARING ADJUSTMENT

1. Place all shaft assemblies into position in one housing half. Place other ends of shafts through one Gasket (21) and remaining housing half.
2. Align dowel pins or bolts (except Model 22) in housing halves and rotate shafts by hand to check that gears are meshed before bolting halves together loosely. Note: On Model 200 Reducers, be sure to use the three longest cap screws to fasten the Mounting Brackets (22).
3. Install o-rings (9) into O-ring grooves in open and closed caps. Apply grease liberally on surface of all o-rings before assembly into housings. Install open and closed caps with three shims (23) between each cap and housing half. Secure caps with appropriate number of capscrews which are torqued down evenly on all sides.
4. Bearings (11) and (13) are then adjusted by removing or adding shims until the bearings bind and then add one shim at a time until shaft or sleeve rotates freely, with no end play. Note – Position of gear will be closer to center if the number of gaskets on each cap does not vary by more than one.

NOTE: Model 22 and 230 Reducers have bearing cups pressed into case halves instead of caps and are adjusted by adding or removing gaskets between case halves. Model 230 has needle bearings on the high speed shaft and care should be taken that adjustment does not cause needle thrust bearing (not shown) to bind.

5. When bearings have been properly adjusted, remove cap screws a final time, clean threads on screws and in holes with degreaser, and coat threads with Loctite®. If Loctite® or equivalent is not available, use lock washers (not supplied) behind screw heads on caps and behind hex nuts on case half. Torque down all screws evenly. CAUTION — Do not get Loctite® on seals or bearings.

OIL SEAL INSTALLATION

1. Install Oil Seal (1, Figure 7) in Open Caps (7, Figures 5 and 6) by sliding seal over tapered end of Pilot Sleeve (2, Figure 7). Make sure that the spring loaded lip of the seal is facing toward the Parallel Shaft Reducer.
2. Slip pilot sleeve over shaft and down until end of sleeve is against bearing.



FIGURE 8 – Seal Driver

3. Install Seal Driver (1, Figure 8) over pilot sleeve and tap seal down sleeve until it is seated in cap or housing half. Remove seal driver and pilot sleeve. Note: These installation tools are available from Hub City.

If a pilot sleeve and seal driver (or their equivalent) are not readily available, seal must be installed with a rubber hammer or block of wood to prevent seal damage.

CAUTION

Damage to seals can be avoided when installing seals without sleeve and driver tools by covering the shaft keyways with cellophane tape, plastic shim stock or paper before sliding seals onto shaft.

REFILLING GEAR CASE WITH LUBRICANT

Clean and recoat Drain Plug (1, Figures 5 and 6) with pipe sealant and replace in bottom of gear case. Fill gear case with recommended lubricant and follow all recommended procedures detailed in Lubrication and Installation Instructions which are included with each drive. Replace pipe sealant coated Level Plug (17, Figures 5 and 6) and Fill or Vent plug (18, Figures 5 and 6).

CAUTION

Do not operate the unit without making sure it contains the correct amount of lubricant. Do not overfill or underfill, or injury to personnel, unit, or other equipment may result.

CAUTION

Do not mix nonsynthetic and synthetic oil in the unit.

WARNING

Make certain that all tools and other items are clear from rotating parts before starting machine. Stand clear, and start machine slowly to be sure all components are secure, and operating properly.

For further information that may be helpful, see the Lubrication, Installation and illustrated Replacement Parts sheets for your Reducer. Should a particular problem arise or additional information be required, contact the nearest HUB CITY Sales Office or Industrial Power Transmission Distributor which are listed in the Yellow Pages or contact HUB CITY – Aberdeen, S.D.