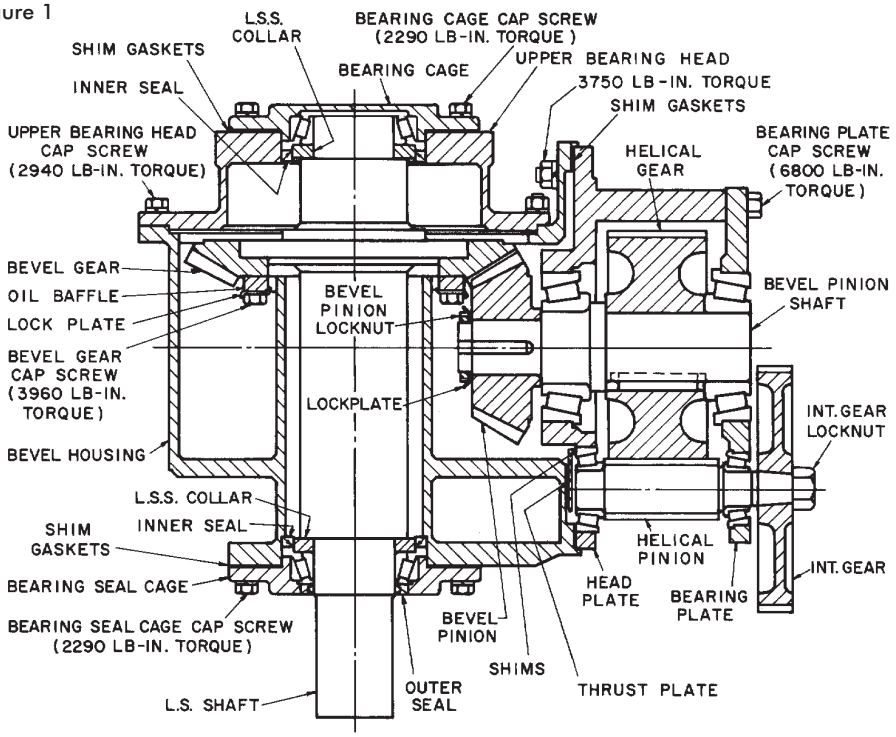
Introduction

The following instructions cover replacement of bevel gears in standard Type EB Motoreducers and CB Speed Reducers. When ordering spare parts or requesting information, specify M.O. number, model number, rpm, ratio and date stamped on reducer nameplate.

GENERAL MAINTENANCE — Refer to Service Manual 338-210 or 338-214 for general maintenance instructions.

SEALS — For seal replacement refer to Service Manual 338-208.

Figure 1



Required Equipment

In addition to standard mechanic's tools, the following equipment is required: hoist, sling, 10 to 20 ton hydraulic press, wheel puller, torque wrench, feeler gauges, dial indicator, depth and outside micrometers.

The preferred method of bevel pinion removal requires a 10 to 20 ton hydraulic press while the alternate method requires an acetylene torch and wheel puller. USE TORCH ONLY IF BEVELS ARE TO BE SCRAPPED.

General Instructions

WARNING: Consult applicable local and national safety codes for proper guarding of rotating members. Lock out power source and remove all external loads from drive before servicing drive or accessories.

HOUSING — Clean external surfaces of reducer before disassembly to prevent dirt from falling into drive. Record mounting dimensions of accessories for reference when reassembling.

SHIMS & GASKETS — Wire or tie all shims and gaskets to a mating part so they will be available for reference when reassembling the drive.

NOTE: Bevel gearing is case hardened after cutting, and subsequently lapped in matched and marked sets to ensure proper tooth contact. Unless bevel pinions and gears are installed as matched sets in accordance with the following instructions, Rexnord cannot be responsible for the rating, life, noise or performance of the parts or the products receiving them.

Bevel Pinion Removal

1. PREFERRED METHOD — Figures 1, 2 and 3.
   A. Remove the bevel housing assembly and the head and bearing plate assembly as illustrated in Figure 2. DO NOT DAMAGE GEAR TEETH.
   B. Remove intermediate gear locknut. Remove the intermediate gear by prying under the hub and striking the end of the shaft sharply with a brass drift.
   C. Remove bearing plate and the helical pinion assembly.
   D. Remove bevel pinion locknut.
   E. Stand the head plate assembly in a press, as shown in Figure 3 (resting on the pillars, but not on the dowels). Apply force to the end of the bevel pinion shaft to push shaft out of pinion.
2. ALTERNATE METHOD — Figures 1, 2 and 4. DO NOT USE THIS METHOD UNLESS BEVELS ARE TO BE SCRAPPED.
   A. Remove bevel housing assembly and head and bearing plate assemblies as illustrated in Figure 2.
   B. Remove bevel pinion locknut.
   C. Mount a bearing puller, as shown in Figure 4, and apply as much pressure as puller can stand.
   D. If pinion does not pull free with the puller alone, place asbestos reflector pad between head plate and the bevel pinion as shown in Figure 4. Heat pinion quickly with an acetylene torch, but only over the keyway, and continue to apply force with bearing puller until pinion is free.

   CAUTION: Do not apply heat all around the pinion. To remove the pinion, it is essential that it be heated as quickly as possible, without heating the shaft. Once a pinion has been heated, it has been distorted and has lost its required hardness. Do not re-use.

Figure 2

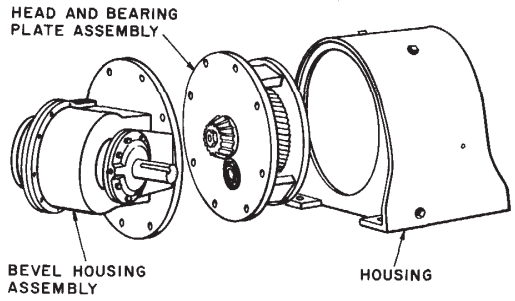


Figure 3

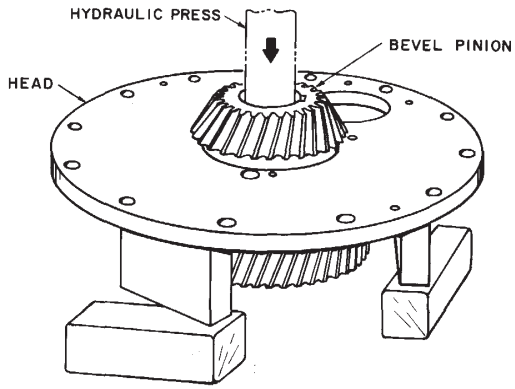
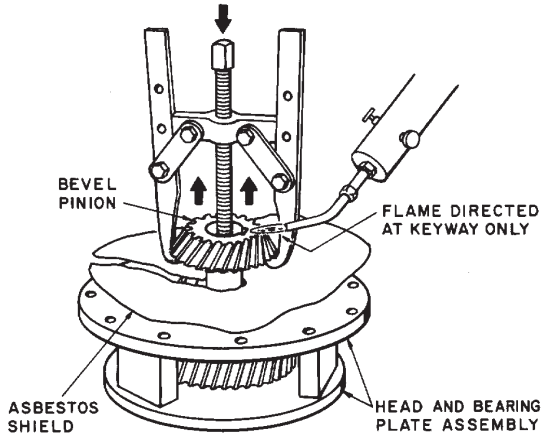


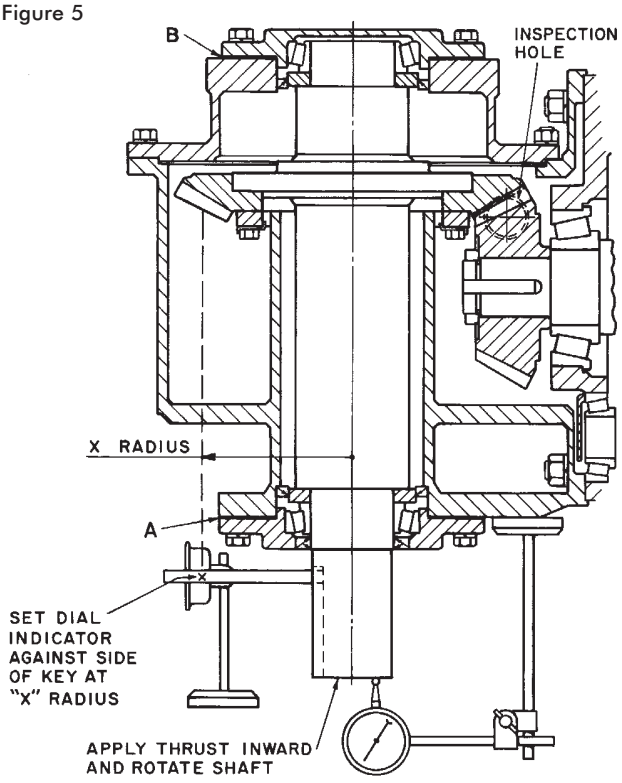
Figure 4



Bevel Housing Disassembly

3. Figure 1.
   A. After bevel housing assembly has been removed from the drive, remove the bearing cage and upper bearing head.
   B. Remove the bevel gear shaft assembly. Then remove the bevel gear from the low speed shaft.

Figure 5



Parts Replacement

4. BEVEL GEAR & PINION
   For future reference in the steps that follow record the Mounting Distance (MD) and Backlash (BL) which are etched on the bevel pinion or gear.
5. BEARINGS.
   A. Wash all bearings in clean kerosene and then dry. Do not spin bearings for they may score due to lack of lubricant.
   B. Inspect bearings carefully and replace those that are worn or questionable.
   C. Use a wheel pulley or press to remove bearings. Apply force to inner race only . . . not to cage.
   D. To replace bearings and low speed shaft collars, heat in an oil bath or oven to 275°F (135°C) and slide or press onto shaft tight against shaft shoulder. To prevent damage DO NOT heat beyond a maximum temperature of 400°F (205°C). When heating bearings, do not apply flame directly to bearings or rest bearings on bottom of heated container.
   E. Thoroughly coat all bearings with lubricating oil.
6. BEVEL HOUSING — Remove sealing compound from bevel housing split. Clean all parts with kerosene or solvent and then dry.

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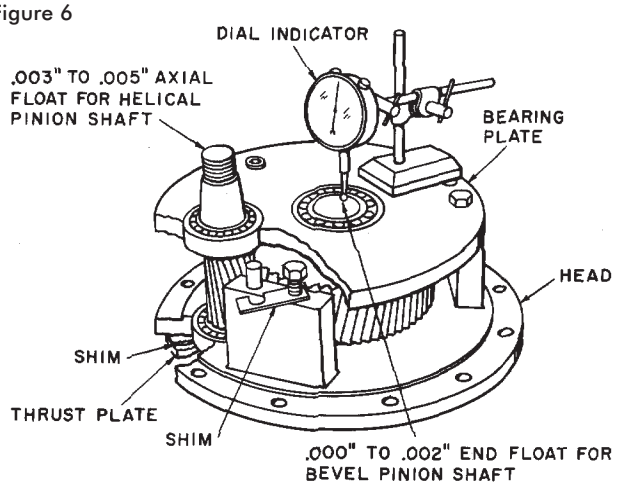
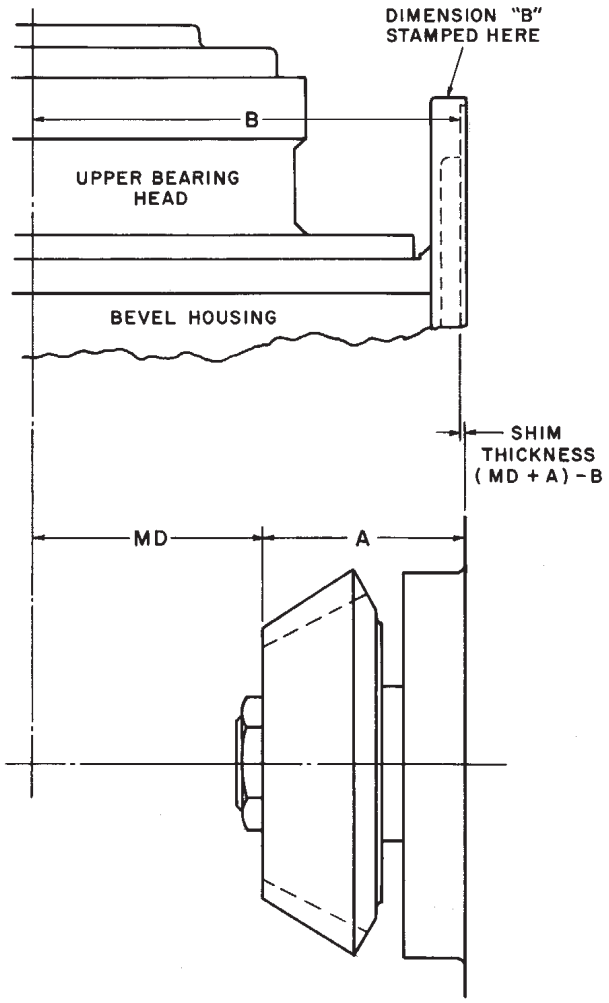
Figure 6



Assembly

7. BEVEL HOUSING ASSEMBLY — Figure 1 .
   A. Mount bevel gear, oil baffle, lock plate and cap screws on low speed shaft. Apply a light coat of oil to the bevel gear cap screws and tighten to 3960 lb-in. torque. Lock cap screws with lock plates.
   B. Replace old shim gaskets wired to bearing seal cage and bearing cage with new shims of equal thickness. NOTE: USE ONLY REXNORD SHIMS AND GASKETS.
   C. Install outer race of low speed shaft bearings in bearing cage and bearing seal cage. Install both inner seals.
   D. Mount bearing seal cage and shims on bevel housing. Tighten cap screws to 2290 lb-in. torque.
   E. Stand drive on end so bevel gear opening is up. Coat low speed shaft collars with grease. Lower low speed shaft assembly into bevel housing, being careful that shaft collar enters seal properly.
   F. Coat joint between bevel housing and upper bearing head with Permatex #3. Carefully lower upper bearing head onto bevel housing. Tighten cap screws and nuts to 2940 lb-in. torque.
   G. Mount bearing cage and shim gaskets on upper bearing head. Tighten cap screws to 2290 lb-in. torque.
   H. Check axial float of low speed shaft with a dial indicator as shown in Figure 5. Set axial float .000" to .002" loose by adding or subtracting shim gaskets from the bearing cage joint.
8. **BEVEL PINION ASSEMBLY** — Figure 6.
   A. Reassemble helical pinion and gear elements in head plate and bolt on bearing plate. Tighten to 6800 lb-in. torque.
   B. Check axial float of bevel pinion shaft with a dial indicator as shown in Figure 6. Set axial float .000" to .002" loose with shims between the head plate and bearing plate. Use an equal shim pack thickness for each pillar.
   C. Check axial float of helical pinion shaft with a dial indicator as shown in Figure 6. Set axial float .003" to .005" loose with shims between the thrust plate and head plate. Tighten thrust plate screws and lock by peening.

Figure 7



   D. Heat bevel pinion in an oven or oil bath from 350° to 375°F (177° to 191°C) and shrink onto shaft. To prevent damage DO NOT heat beyond a maximum temperature of 400°F (205°C). TO PREVENT DISTORTION WHEN HEATING PINION DO NOT APPLY FLAME DIRECTLY TO PINION OR REST THE PINION ON THE BOTTOM OF THE HEATED CONTAINER.
   E. Tighten bevel pinion locknut and secure lock plate.
   F. Position gasket against reducer housing and carefully install head plate sub-assembly.
9. **BEVEL GEAR SET ADJUSTMENT** — Figures 5 and 7.
   A. Measure distance "A" (Figure 7) with a depth micrometer.
   B. Add to "A" the mounting distance (MD) which is etched on the bevel gear or pinion hub face.
   C. From (A + MD), subtract dimension "B" as shown in Figure 7. The difference is the shim pack thickness required. Select shims which total within .000" to +.004" of the calculated value.

D. Mount shim gaskets over studs and against head plate. Mount bevel housing on head plate. Draw up nuts while rotating high speed shaft to be certain gears do not bind. Tighten nuts to 3750 lb-in. torque.

E. Wedge key into keyseat of low speed shaft as shown in Figure 5. Place a dial indicator squarely against side of key at a distance of approximately one-half the bevel gear pitch diameter.

F. Place a pry bar through one inspection hole and wedge pinion to prevent the bevel pinion from rotating when indicating backlash.

G. Apply thrust inward and rotate the low speed shaft back and forth. Read the backlash (tooth clearance) on indicator.

H. Final backlash at the mesh must equal etched backlash on bevel gear or pinion within .000" to +.004".

(1) To increase backlash, transfer shims from position A to position B. Re-tighten cap screws to 2290 lb-in. torque and recheck backlash.

(2) To decrease backlash, transfer shims from position B to position A. Re-tighten cap screws to 2290 lb-in. torque and recheck backlash.

(3) Install outer seal.

10. **REDUCER INSTALLATION.**

A. Turn the gear train over by hand for a final check.

B. Reinstall the reducer and accessories.

C. Fill reducer with oil to the level indicated. Grease low speed shaft bearings.

D. Run the reducer without load. After reducer runs satisfactorily, apply load. Inspect periodically until operation is deemed satisfactory.

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