

BOWLIN Engineering Co.

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DISASSEMBLY/ASSEMBLY PROCEDURES FOR B-20-3 & B-40-3 REDUCERS

Refer to drawings 4-334.0 & 4-334.3.

1. Drain gear oil
2. Remove all gearcase bolts.
3. Carefully remove top half of gearcase (gears could be damaged if the gearcase strikes the teeth).
4. Input shaft disassembly:
 - a. Lift the input shaft out of gearcase.
 - b. Use a bearing puller to pull bearing capsule off of the bearing.
(NOTE: While removing double spherical roller bearings such as AB, H and M, if the inner and outer races are allowed to become too far out of alignment, the rollers may fall out.)
 - c. Remove the bearing with bearing puller.
5. Load brake disassembly:
 - a. Lift the load brake assembly out of gearcase.
 - b. Pull bearings as in step #4.
 - c. Place assembly in a vice with cam (AL) up and brake pinion (AD) down.
 - d. Remove cam nut key (AK) by inserting a $\frac{1}{4}$ " bolt and pulling out.
 - e. Unscrew cam nut (AL) by turning motor gear (AP). (Note: Be careful not to let the cam surfaces jam.)
 - f. Remove motor gear (AP).
 - g. Remove brake ratchet plate (AG).
 - h. Remove brake disks (AR).
 - i. Pull brake backup plate (AF) with large gear puller.
 - j. Pull brake pinion (AD) with large gear puller.
6. Ratchet pawl disassembly:
 - a. Remove snap ring (AQ).
 - b. Drive pawl pivot pin (AU) out of the pawl.
 - c. Lift the pawl (AX) out of the gearcase.
7. Drum pinion disassembly:
 - a. Lift the drum pinion assembly out of the gearcase.
 - b. Remove bearings as in step #4.
 - c. Press intermediate gear (T) off of the pinion.

3. Drum gear disassembly:

- a. Lift the drum gear assembly out of the gearcase.
- b. Remove cover plate (K) from bearing capsule (J).
- c. Using large snapping pliers, remove snap rings (N) and (L).
- d. Pull bearing (M) as in step #4.
- e. Press drum gear (A) off of output shaft (F).
- f. Pull bearing (H) as in step #4.

Reverse procedures for assembly.

NOTE: When replacement parts are required they can be ordered from the parts list on the assembly drawing. When ordering parts it is necessary that the model number and serial number is furnished to the factory as there are changes made in the gearing of the reducers over a period of time. These changes are made to improve the quality of the reducers and re-designed parts will fit housings in the field when sets of parts are ordered at the same time. For this reason it is a good policy to install both the pinion and gear when either member of the gear set requires replacement.

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INSTALLATION INSTRUCTIONS

Be sure that the base supporting the reducer and motor is solid and that the anchor bolts are securely fastened to a good foundation. If the reducer is to be directly connected to an electric motor by means of a flexible coupling, care should be exercised that there is proper spacing between the input shaft of the reducer and motor (refer to gear coupling installation instructions). Both the motor and shaft and the reducer input shaft should be aligned as closely as possible so that a minimum of misalignment is obtained in the assembly. In this way the coupling will give better service than when misaligned.

Should the speed reducer be driven with a V-Belt drive, the sheave which is fitted to the input shaft of the reducer should be mounted as closely to the reducer as possible to reduce the overhung load.

Before mounting couplings, sheaves, or sprockets on the shafts of the reducers, a thin coat of grease should be applied to the shafts, which will help in removing any of these items at a later date.

Be sure to fill the reducer with straight 140 weight mineral oil (Texaco or Thuban 140) to the proper oil level before operating.

LUBRICATION INSTRUCTIONS

Before operating any new speed reducer, be sure to fill the reducer with the proper grade of oil, to the proper level. After the first 100 hours of operation, the oil in the speed reducer should be drained, and the speed reducer inspected for any leakage.

Refill the speed reducer with clean oil to the proper oil level. Do not overfill, as too much oil causes excess heating and leakage through the oil seals, and decreases the efficiency of the reducer.

The oil should be inspected at regular intervals and should be changed at least twice each year. Use 140 weight straight mineral oil in the speed reducer.

When reducers are exposed to outside weather conditions and are not operated during the winter season, the reducers should be completely filled with oil during the non-operating winter season. This will prevent water from forming in the reducer due to temperature changes, which will cause the bearings to rust and shorten the life of the reducer. Drain oil to proper oil level before returning the reducer to operation.

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CLEANING BEARINGS

Cleaning Unmounted Bearings Which Have Been in Service

The necessity for cleaning bearings will arise in service, where bearings have been removed from their positions during the overhauling of equipment, or where it becomes necessary to clean them as assembled in installations to remove accumulated dirt or deteriorated lubricants.

Place the bearings in a wire basket and suspend the basket in a suitable container with clean, cold petroleum solvent or kerosene and allow the bearings to soak, preferably overnight. Sometimes it may be found expedient to soak the bearings in hot, light oil (200° F to 240° F), agitating the basket slowly through the oil from time to time. This method is helpful, for instance, in removing lithium soap grease, which is more difficult to remove than lime and soda soap greases. In extreme cases of badly oxidized grease, boiling in emulsifying cleaners diluted with water will usually soften the contaminating sludge.

When the grease has been sufficiently softened, the bearings are drained and, if they have been boiled in aqueous emulsion, spun individually until the water has evaporated. They are then immediately put in a second container of clean petroleum solvent and cleaned individually. Turn the bearings slowly and work with a brush to dislodge chips or solid particles before finally spinning the bearing partially submerged in the solvent. Repeated soaking and cleaning may be necessary.

After the bearings have been cleaned, they should be spun in light oil in order to remove the solvent completely. If the bearings are not to be remounted immediately, they should be coated with petrolatum and wrapped in clean oil-proof paper while awaiting reassembly.

The use of chlorinated solvents of any kind is not recommended in bearing cleaning operations because of the health and rust hazards involved. Compressed air should not be used unless it is known to be clean and dry. If it is used, the bearing must not be allowed to spin during the blowing.

Cleaning Bearings Which Are Mounted in Machines

For cleaning bearings while mounted, hot, light oil at 180° F to 200° F, may be flushed through the housing while the shaft or spindle is slowly rotated. In cases of badly oxidized grease and oil, hot aqueous emulsions may be poured into the housing, preferably while rotating the bearing until it is satisfactorily cleaned. The solution must then be drained completely, and the bearing and housing flushed with hot light oil and again drained, still during rotation if possible, before adding new lubricant. In some very difficult cases, an intermediate flushing with a mixture of alcohol and light mineral solvent, after the emulsion treatment, may be useful.

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If the bearing is to be relubricated with grease, some of the fresh grease may be forced through the bearing to purge any remaining contamination. This practice cannot be used unless there is a drain plug which can be removed so that the old grease may be forced out. Also, the bearing should be operated for at least twenty minutes before the drain plug is replaced, since excess lubricant will cause serious overheating of the bearing.

Oils Used for Cleaning

Light transformer oils, spindle oils or automotive flushing oils are suitable for cleaning bearings, but anything heavier than light motor oil (SAE 10) is not recommended. An emulsifying solution made with grinding, cutting or floor cleaning compounds, etc., in hot water, has been found effective. Petroleum solvents should be used with the usual precautions associated with fire hazards.