How to Use this Manual

This manual provides detailed instructions on installation of internal backstops. Use the table of contents below to locate required information.

CAREFULLY FOLLOW THE INSTRUCTIONS IN THIS MANUAL FOR OPTIMUM PERFORMANCE AND TROUBLE FREE SERVICE.

Table of Contents

Introduction

The following instructions apply to installation of internal backstops for Sizes 2040 through 2090. Backstops are not available for drives with 1.5:1 through 4.57:1 ratios.

CAUTION: If backstop is to be replaced the low speed pinion must also be replaced. Refer to the appropriate section of the owners manual for instructions regarding low speed pinion replacement.

CAUTION: EP LUBRICANTS & INTERNAL BACKSTOPS—Do not use EP lubricants or lubricants with anti-wear additive or lubricant formulations including sulfur, phosphorus, chlorine, lead derivatives, graphite, or molybdenum disulfides in drives equipped with internal cartridge type backstops.

CAUTION: SYNTHETIC LUBRICANTS & INTERNAL BACKSTOPS—Synthetic lubricants may be used in gear drives with internal backstops operating only in cold temperatures -30° to +50°F

BACKSTOP APPLICATION—Backstops are designed to prevent reverse rotation or backrun without backlash in applications such as conveyors, bucket elevators, fans, rotary pumps, and kilns. Backstops are not approved for use on systems that are designed for handling of people such as elevators, man lifts, ski tows, and ski lifts. DO NOT use a backstop as a substitute for a brake.

INDEXING—DO NOT use the backstop for indexing applications. The backstop is designed to prevent reverse rotation five times or less in eight hours, with one minute or more in the overrunning direction between backstopping load applications. If backstopping operations are more frequent, or the time between operations is less than one minute, the backstop is classified as an indexing device and must be referred to the Factory.

DRIVE WITH BACKSTOP: To prevent damage to the backstop due to incurred motor shaft rotation at start up, couplings are NOT assembled when drives are furnished with backstops. After completing the electrical connection, check motor and drive shaft rotations. Then complete alignment and assembly of coupling.

IMPORTANT: If backstop slippage occurs, return the backstop to Factory for inspection and replacement. Attach a "Returned Material Authorization" tag which is available from Rexnord-Falk Representatives and the Factory.

Backstop Installation

For all Sizes 2040 thru 2090, the low speed pinion shaft has an extension to accommodate the mounting of an internal cartridge type backstop (See Figure 1).

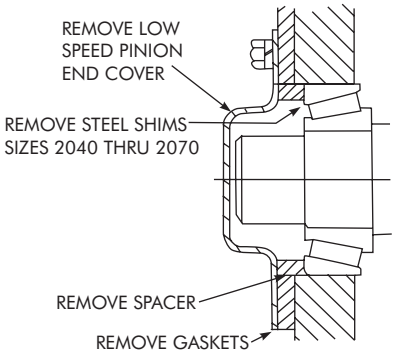

Figure 1
Sizes 2040 thru 2090

IMPORTANT: When installing an internal backstop, the low speed pinion bearing float must be reset for all drive sizes, for both first time backstop installations and backstop replacements. This is accomplished by use of either steel shims or composition shim-gaskets at the backstop/drive interface. To aid in obtaining proper bearing float, the drive should be orientated with Low Speed pinion shaft in vertical position. Refer to the following instructions for specific information.

Only Size 2090 has a reversible backstop cage. All other drive sizes require that the backstop be removed from the cage and re-assembled to allow the backstop to operate in the desired direction.

CAUTION: All drive sizes incorporate the use of an oil feed hole which runs through the housing and backstop cage. The oil feed hole must be open to allow lubricant to reach the backstop.

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. Drain oil from drive.

1. **SIZE 2040** —Figures 1 and 2.
   a. Drain oil from drive and remove the low speed pinion end cover located below the low speed shaft, Figure 1. Remove the spacer. Remove the steel shims located against the outer bearing cup and wire together for future reference. Remove old gasket material from outside of the low speed retainer. Do not disturb the five fasteners located around the low speed shaft.

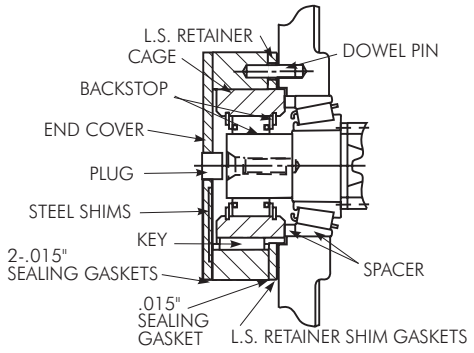

Figure 2
Size 2040

   b. Install one .015" thick gasket against the low speed retainer.
   c. Remove pre-assembled backstop from package and wipe off any excess lubricant. The lubricant is oil soluble and need not be removed completely.

      CAUTION: Before installing backstop, note backstop overrunning (free rotation) direction indicated by the arrow etched on each side of backstop.
   d. Press the dowel pin into backstop cage. Remove any burrs from the backstop OD and cage ID with emery cloth.
   e. Coat cage bore with a thin film of light mineral oil. Set backstop cage on a level, horizontal surface with the dowel pin facing up.
   f. Install the chamfered backstop key into the backstop cage.
   g. Install the backstop into the backstop cage with rotation arrow facing the desired direction of free rotation.

      NOTE: The fit between the backstop and cage is clearance fit; however, machined tolerances are tightly held to provide accurate backstop positioning. This results in close fitting parts which can be difficult to assemble. When installing the backstop into the cage, make certain that the backstop is not cocked or tilted in the cage bore. Lightly tap the backstop outer race from side to side until the backstop slides freely in the bore. DO NOT force the backstop into the cage bore, or damage may occur.
   h. Position the backstop in the cage with the outboard side slightly recessed in the cage to allow backstop to register in housing bore (See Figure 2, Page 2).
   j. Install spacer against the low speed pinion outer bearing cup.
   k. Oil backstop sprags and low speed pinion shaft extension. Gently slide the backstop assembly onto the shaft and into the housing bore while rotating the shaft in the overrunning direction. Engage backstop cage dowel into mating hole in housing wall. DO NOT FORCE OR HAMMER . . . this may damage the shaft surface or misalign sprags.
   l. Install two, 2" long headless set screws or studs through the backstop cage and into the drive. Refer to Table 1, Page 6, for diameter of setscrews and studs.
   m. Check operation of backstop by turning the input shaft in the required direction of rotation by hand. If the shaft does not rotate in the required direction, remove backstop assembly, remove backstop from cage, reverse backstop and reinstall as instructed in the preceding steps.
   n. Rotate input shaft in the required direction of rotation and then reverse the rotation to lock up the backstop. Observe the position of the sprags. All sprags must be engaged and lay evenly spaced around the shaft. If the sprags are not uniformly positioned, lightly tap the backstop cage to centralize all of the sprags around the shaft and cage. If sprags cannot be uniformly positioned in this manner, remove the backstop and run a finger around the sprags in the overrunning direction. Reinstall backstop as instructed in the proceeding steps.

      Check the position of the sprags several times by overrunning and locking the sprags. If all sprags move uniformly, hold the backstop in the locked position and proceed to the next assembly sequence.
   o. Install .030" steel shim provided with backstop kit to the backstop outer face (stick on with grease).
   p. Install two .015" thick gaskets between the backstop cage and end cover. Remove setscrews or studs and install fasteners (with lock washers); torque to value shown in Table 1, Page 6.
   q. Install a .375 - 16 UNC x 2.50" long fastener through the hole in backstop end cover and into tapped hole in shaft extension. Tighten fastener until it is bottomed out in tapped hole to eliminate clearance between threads.
   r. Check shaft float by applying thrust in both directions. Make sure inner bearing cup is seated by tapping on fastener head while rotating shaft in overrunning direction. Position dial indicator stem on top of fastener and set to zero. Using a pry bar, apply a shaft float as indicated on the dial indicator. Record amount of shaft float as indicated on the dial indicator. (See Figure 3).

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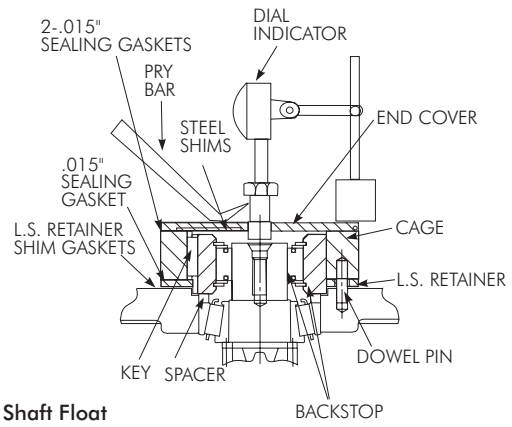

Figure 3
Measuring Shaft Float

s. Remove backstop end cover and add steel shims to obtain.001 to .003" axial shaft float (refer to Table 2, Page 6, for available steel shim thickness). Recheck shaft float and install plug in end cover with Permatex.

Example:

Dial Indicator Reading =	.024" float
Specified Axial Float =	.002" (.001-.003)
Steel Shims Required =	.022" (.010,.010, .002)

t. Affix high speed shaft rotation arrow to the high speed end of drive. Affix backstop caution labels to drive.

u. Refer to Lubrication Recommendations section of owners manual for recommended lubricants.

CAUTION: Do not use extreme pressure lubricants in drives equipped with internal type backstops.

2. **SIZES 2050 & 2060** —Figures 1 & 4

a. Follow steps a through c from Section 1, Size 2040.

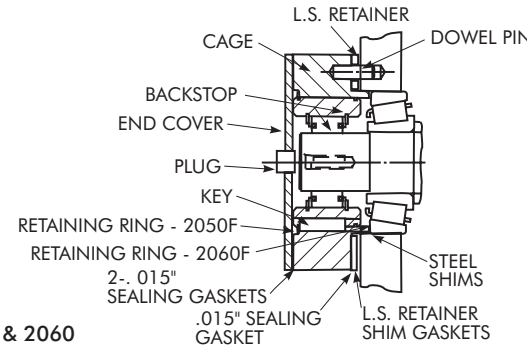

Figure 4
Sizes 2050 & 2060

b. For Size 2050, install retaining ring into groove in backstop OD adjacent to outer face as determined by desired shaft rotation. For Size 2060, install retaining ring into groove in backstop cage bore.

c. Remove any burrs from the backstop OD and cage bore with emery cloth. Coat the cage bore with a thin film of light mineral oil.

d. Install the chamfered backstop key into the backstop cage.

e. Set the backstop cage on a horizontal surface with the housing bore register facing down. Install the backstop into the outboard side of the backstop cage with the rotation arrow facing in the desired direction of overrunning. Make sure backstop is tight against retaining ring.

NOTE: The fit between the backstop and cage may be a light interference fit. Make certain the backstop is not cocked or tilted in the cage bore and press backstop into the cage until tight against retaining ring.

f. Turn cage over and press the dowel pin into the backstop cage.

g. From steel shim pack previously wired together, remove approximately .015" of steel shims to ensure bearing float. Install remaining steel shims against low speed pinion outer bearing cup.

h. Follow steps k through m from Section 1, Size 2040, to mount backstop to drive.

j. For Size 2050 only, follow step n from Size 2040, Section 1 to position sprags uniformly around shaft.

k. Follow steps p through u from Section 1, Size 2040, to set bearing float.

3. **DRIVE SIZES 2070 & 2080**—Figures 1 & 5

a. Drain oil from drive and remove the low speed pinion end cover and spacer located below the low speed shaft, (See Figure 1, Page 1). Size 2070; Remove steel shims located against the outer bearing cup and wire together for future reference. Remove old gasket material from the outside of the low speed retainer. Do not disturb the six fasteners located around the low speed shaft.

b. Remove pre-assembled backstop from package and wipe off any excess lubricant. The lubricant is oil soluble and need not be removed completely.

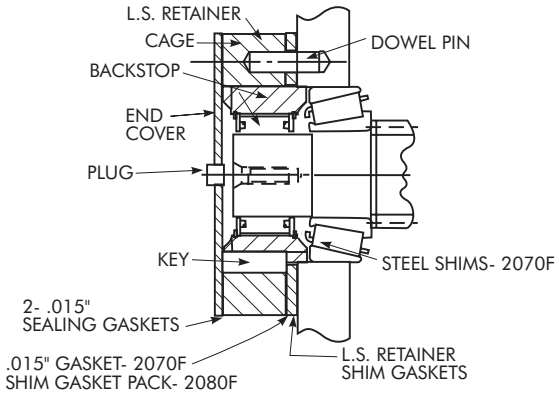

Figure 5
Sizes 2070 & 2080

CAUTION: Before installing backstop, note backstop overrunning (free rotation) direction indicated by the arrow etched on each side of the backstop.

c. Follow steps d through g from Section 1, Size 2040, to install the backstop into the cage.

d. Position the backstop in the cage with the backstop protruding approximately .10" beyond the cage outer face.

e. For Size 2070; install one .015" thick gasket against the low speed retainer. Remove approximately .015" steel shims from the steel shim pack previously wired together, to ensure bearing float. Install remaining steel shims against the low speed pinion outer bearing cup. For Size 2080; Refer to Table 2, Page 6, for a listing of shim-gaskets and their compressed values. Install up to .167" (compressed thickness) of shim-gaskets between the L.S. Retainer and the backstop cage to ensure bearing float. Include only one .015" shim-gasket in the pack and mount that .015" shim-gasket against the L.S. retainer. **NOTE:** Use only Rexnord shim-gaskets.

f. Follow steps k through m from Section 1, Size 2040, to mount backstop to drive.

g. Install one .015" thick gasket between the backstop cage and end cover.

h. Remove set screws or studs and install end cover and fasteners with lock washers; torque to value shown in Table 1, Page 6. **IMPORTANT:** Use only the fasteners provided in the kit.

j. Follow steps q and r from Section 1, Size 2040, to measure bearing float.

k. For Size 2070; remove backstop endcover and backstop cage and add required amount of steel shims to obtain .001" to .003" axial shaft float (Refer to Table 2, Page 6, for available steel shim thickness). For Size 2080, remove backstop end cover and backstop cage and remove shim gaskets to obtain .001" to .003" axial shaft float. Do not remove the one .015" shim-gasket mounted against the L.S. retainer.

l. Recheck shaft axial float after re-assembly and install plug in endcover with Permatex.

EXAMPLE:

1. A Size 2080 low speed pinion shaft has a measured axial float of .080". The specified axial float is .001" to .003".

2. Total required shim removal is:
.077" to .079" or (.080" -.003") to (.080 -.001").

3. Assuming shim pack is composed of:

(3) .007" (.006" compressed) = .018"
(3) .009" (.008" compressed) = .024"
(1) .015" (.013" compressed) = .013"
(3) .031" (.028' compressed) = .084"
Total = .139"

4. Assuming shim pack is composed of:

(3) .007" (.006" compressed) = .018"
(3) .009" (.008" compressed) = .024"
(3) .031" (.028' compressed) = .056"
Total = .078"

m. Affix high speed shaft rotation arrow to the high speed end of drive. Affix backstop caution labels to drive.

n. Refer to Lubrication Recommendations section of owners manual for recommended lubricants.

CAUTION: Do not use extreme pressure lubricants in drives equipped with internal type backstops.

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4. **SIZE 2090**—Figures 1 & 6.
   a. Drain oil from drive and remove the low speed pinion end cover and spacer located below the low speed shaft (See Figure 1, Page 1). Remove old gasket material from the housing surface.

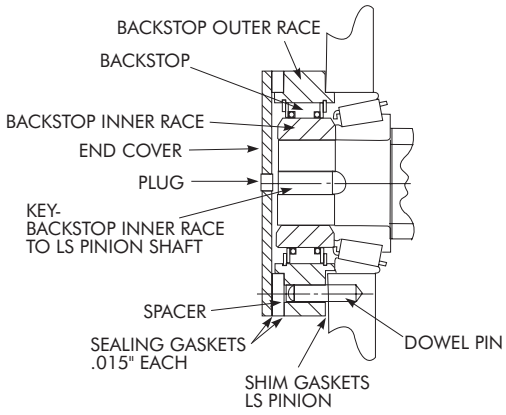

Figure 6
Size 2090

   NOTE: For Size 2090, the backstop outer race is designed to bolt to the drive housing: consequently, there is no backstop cage.

   b. Remove pre-assembled backstop from package and wipe off any excess lubricant. The lubricant is oil soluble and need not be removed completely.

      CAUTION: Before installing backstop, note backstop overrunning (free rotation) direction indicated by the arrow etched on each side of the backstop.

   c. Press dowel pin into hole in drive housing located directly below the shaft center line.

   d. Refer to Table 2 for a listing of shim-gaskets and their compressed values. Install up to .050 (compressed thickness) of shim-gaskets against the drive housing to ensure bearing float. Include only one .015" shim-gasket in the pack and mount that .015" shim-gasket against .015" the housing. Note: Use only Rexnord shim-gaskets.

   e. Disassemble the backstop inner race from the backstop assembly. Set inner race aside.

   f. Install the backstop without inner race to the drive housing. Mount one .015" gasket against the outer face of backstop.

   g. Install the spacer and end cover with one .015" gasket between the two. Install fasteners (with lock washers); torque to values shown in Table 1.

   h. Follow steps q & r from section 1 Size 2040, to measure shaft float.

   j. Remove backstop end cover, spacer, and outer race from the drive. Remove the required thickness of shim gaskets to obtain .001" to .003" axial shaft float. Do not remove the one .015" gasket mounted against the housing.

EXAMPLE:

1. A Size 2090 low speed pinion shaft has a measured axial float of .025". The specified axial float is .001" to .003".
2. Total required shim removal is:
   .022 to .024 or (.025-.003) to (.025 - .001)
3. Assuming shim pack is composed of:
   (3) .007" (.006" compressed) = .021"
   (2) .009" (.008" compressed) = .016"
   (1) .015" (.013" compressed) = .013"
   TOTAL: .050" compressed
4. Remove:
   (1) .007" (.006" compressed) = .006"
   (2) .009" (.008" compressed) = .016"
   TOTAL: .022" compressed
5. Therefore, .025" axial end float minus .022" of shim removal results in .003" axial end float.

   k. Assemble the backstop inner race key to the low speed pinion shaft.

   l. Heat the backstop inner race to 200° to 250°F and assemble to the shaft. This is required to expand the inner race and allow it to fit over the shaft extension. Make certain that inner race is seated against the bearing cone and that the cone is seated against the shaft shoulder.

   m. Stake the key on both sides near the bottom of the keyway.

   n. Oil backstop sprags and inner race. With previously determined amount of shim-gaskets mounted against the housing, gently slide the backstop onto the inner race and into the housing bore while rotating the shaft in the overrunning direction. Engage the housing dowel pin into the mating hole in the backstop outer race.

   o. Check the operation of backstop by turning the input shaft in the required direction of rotation by hand. If the shaft does not rotate in the required direction, remove the backstop, reverse and reinstall as instructed in preceding step.

   p. Mount one .015" gasket against the outer face of backstop. Install the spacer and end cover with one .015" gasket against between the two. Install fasteners (with lock washers); torque to values shown in Table 1.

   q. Recheck shift axial float after re-assembly and install plug in end cover with Permatex.

   r. Affix high speed shaft rotation arrow to the high speed end of drive. Affix backstop caution labels to drive.

   s. Refer to Lubrication Recommendation section of owners manual for recommended lubricants.

      CAUTION: Do not use extreme pressure lubricants in drives equipped with internal type backstops.

TABLE 1 — Fastener Tightening Torque +/- 5%

DRIVE SIZE	Quantity	SAE Grade	Diameter & Length	Torque lb-ft (NM)
2040	5	5	.312 - 18 UNC x 2.250	15 (20)
2050	6	5	.375 - 16 UNC x 2.500	27 (37)
2060	6	5	.500 - 13 UNC x 2.750	67 (91)
2070	6	5	.625 - 11 UNC x 3.000	134 (182)
2080	7	5	.625 - 11 UNC x 3.000	134 (182)
2090	8	5	.625 - 11 UNC x 3.000	134 (182)

TABLE 2 — Steel Shims/Shim-Gaskets

Steel Shims	Rexnord Shim-Gaskets	Thickness	
		New	Compressed
.002″	Black Rubber Coated	.007	.006
.005″	Black Rubber Coated	.009	.008
.010″	Gray	.015	.013
.030″	Gray	.031	.028

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