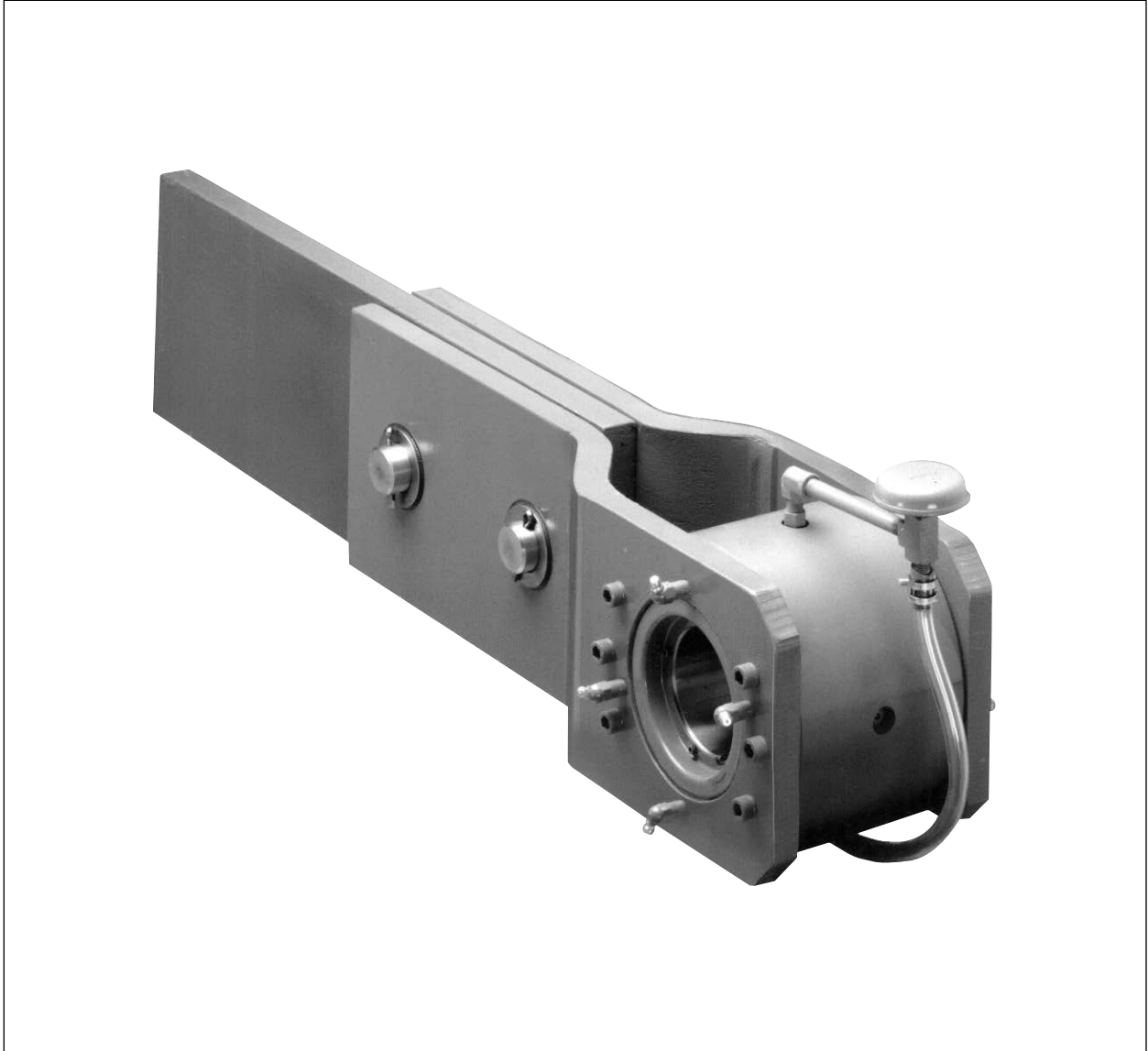


Long Life Holdbacks Model LLH™ 700 thru 1027

Service & Installation Instructions

P-222-14-FC
Bulletin 2224



Introduction

Formsprag LLH – Long Life Hold-backs are specifically designed and built for head shaft mounting on conveyors to prevent reverse rotation. They contain full complements of load carrying Formchrome®, sprags, in “Free-Action” Retainers, for maximum torque capacity. Follow the step by step installation and maintenance instructions in this bulletin for optimum performance and life.

⚠ WARNING Failure to follow these instructions may result in product damage, equipment damage, and serious or fatal injury to personnel.

Pre-installation Check

1. Before installing, check Shaft to Bore fit:

Holdback Bore inches	Recommended Fit* inches
1.937 to 2.125	.001 to .0035 loose
2.250 to 2.500	.001 to .0040 loose
2.625 to 3.000	.001 to .0045 loose
3.250 to 4.000	.001 to .0055 loose
4.250 to 5.937	.001 to .007 loose
6.000 to 6.937	.002 to .008 loose
7.000	.002 to .005 loose

*If a press fit is necessary under special circumstances. **Do not exceed .001 inches tight.**

In some cases, builders of equipment in which a Holdback is used specify other shaft fit limits. In this event, direct questions concerning fit limits to the equipment builder.

Shaft Run-out Recommendations for LLH Holdback Units

LLH Holdback units are designed for installation on primary drive line shafting with typical dimensional tolerances and run-outs. Some applications dictate installation in locations not in the primary drive line, i.e. in locations where tolerances and run-outs exceed “typical” values. In these situations, some basic measurements are required to determine the suitability of the proposed mounting location. Holdback lubrication sealing and overall product life can be adversely affected by excessive shaft run-out or lack of straightness.

Prior to installation in a location outside the primary drive line, shaft run-out should be measured in at least two locations in the Holdback mounting area. Measured values should not exceed those in the following table:

Max Overrunning Speed, RPM	Maximum TIR, inches
Thru 100	0.010
Thru 150	0.006
Thru 250	0.004
Thru 400	0.002

Across the Holdback mounting area, the shaft should be straight within 0.003 inches per foot of length.

These requirements are based on maintaining acceptable axial and radial vibration levels on the Holdback. Installations that exceed these limits can result in leakage of lubricant from the Holdback, excessive seal wear, and premature failure of bearings and/or Sprags.

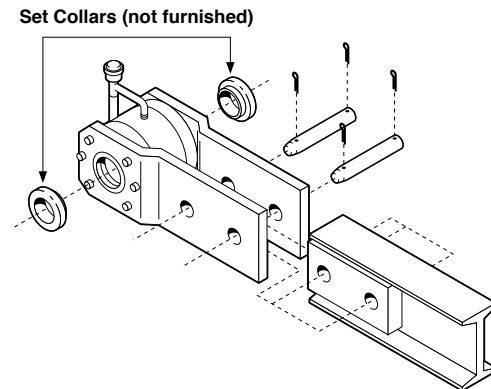


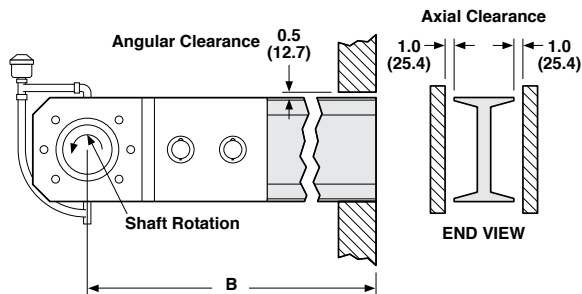
Figure 1

2. **Key and Keyseat**

A hardened key, (25-40 Rockwell “C” scale) is furnished with the Holdback and is as long as the inner race keyseat for proper support. Check shaft keyseat. Key must fit with a “push” fit. Do not use a driving or force fit.

3. **Rotation**

Turn the inner race to check the Holdback for direction of rotation. The arrow on the clutch name plate indicates the direction of inner race overrunning.



Important: Angular and axial clearances must be maintained at all times. Set collars (or other retention devices) should be used on the shaft to maintain axial clearance.

Figure 2

The torque arm reaction force is the force which the torque arm stops must resist. Formsprag recommends that the stops be at least 3/4 of the distance (B) away from the center line of the clutch.

Installing

1. Place inboard set collar on shaft. Set collars should be used to keep Holdback in position on shaft. Otherwise, the Holdback might shift on shaft causing torque arm to bind.
2. Coat Holdback bore, shaft and key with an anti-seize compound to facilitate installation and removal. A supply of this compound is furnished with each new clutch assembly.
3. Place Holdback and key on shaft. Be sure that shaft is free of nicks and burrs.

Note: Oil lubricated Holdbacks should be mounted on horizontal shafts only. For mounting on vertical shafts, contact Formsprag.

4. Apply pressure to end face of inner race only. Pressing against the outer race could preload the bearings excessively. To simplify mounting, should a bore-to-shaft fit of .001 inches tight be required (this is tightest allowable) immerse Holdback in hot, clean oil (not to exceed 200°F/93°C) for ten to fifteen minutes before mounting.
5. Secure Holdback in position on shaft. Use flat washer fastened to shaft end with screw, snap rings or set collars to keep Holdback in position on shaft. It is essential to hold unit in position on the shaft.

6. Position Holdback and torque arm. Coat torque arm pins and pin holes with anti-seize compound (furnished). Insert pins and cotter keys as shown in (Figure 1).
7. Attach torque arm stops to conveyor frame or supporting structure. The stops are required to prevent rotation of torque arm when holdback torque is applied. Allow clearance between stops and torque arm as shown in Figure 2. The clearance is necessary to permit free axial and angular movement of the torque arm resulting from shaft runout and eccentricity. We recommend set collars on shaft to prevent Holdback from shifting which would eliminate this clearance.

Note: Torque arms may be installed at any angle, however, vertical torque arms should be installed at least 10° from the true vertical position. The Holdback should be mounted in an orientation so that the weight of the torque arm will keep the torque arm in constant contact with the reacting surface and structure.

8. Grease auxiliary seals. These labyrinths are built into each Holdback to minimize the harmful effects to the oil seals from dusty or abrasive atmosphere. For instructions on regreasing these seals, follow instructions in (Figure 3).

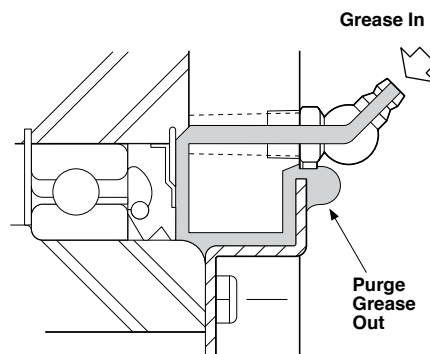


Figure 3

9. Install oil sight gauge attachment. Follow instructions in (Figure 4).

Install breather in highest position after Holdback installation is complete. Follow instructions in (Figure 4).

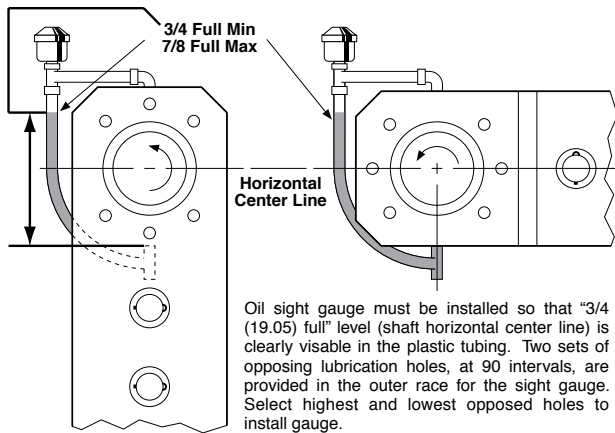


Figure 4

10. Check Holdback lubrication and replace any oil lost while installing gauge.

Note: Oil lubricated Holdbacks which will not be operated within three months after installation should be filled completely full of oil to prevent corrosion of interior surfaces. Excess oil should be drained prior to operation.

Auxiliary Seal Lubrication

1. Lubricate auxiliary seals every **Three Months** of normal operation, more often if extremely dusty conditions prevail. The auxiliary grease seals are protective barriers for the oil seals. Lubricants with EP additives must not be used. Use any of the following greases, or equivalent:

Lubriplate Low Temp (Fiske Bros.)
 Mobil SHC-32 (Mobil Oil)
 Rykon #2 (Amoco)
 Amolith #2 (Amoco)
 Alvania #2 (Shell Oil)

2. With a low pressure grease gun, pump seals full, through fittings on both sides, until old grease is purged and fresh grease runs out around the entire circumference of the seal.
3. Holdbacks supplied for grease lubrication may use Fiske Brothers Lubriplate Low-Temp grease for all lubrication. **See Grease Lubrication.**

Oil Lubrication

Use oil selected from the table below according to the temperature existing at the Holdback. **Holdback should be 3/4 full of oil.** Holdbacks are shipped from

Formsprag 3/4 full of Mobil DTE Heavy Medium oil unless other lubricant was specified on order.

⚠ WARNING The use of lubricants in clutch assemblies, other than those shown, can result in improper sprag engagement. Improper sprag engagement may cause personal injury or property damage.

Oil sight gauge must be installed so that "3/4 full" level (shaft horizontal centerline) is clearly visible in the plastic tubing. Two sets of lubrication holes, at 90° intervals, are provided in the outer race for the sight gauge. Select highest and lowest opposed holes to install gauge.

Formsprag is not responsible for any changes made by the manufacturers in their lubricants.

The use of any lubricants, other than those listed in this bulletin, will automatically void any warranty.

⚠ CAUTION Do not use lubricants containing slippery additives, or those having extreme pressure characteristics such as any EP type lubricants.

Oil Lubrication Maintenance

1. Lubrication is the most important Holdback maintenance factor. Keep oil clean.
2. Check oil level weekly. To add oil, remove breather cover and pour oil into Holdback through the breather housing.
3. Flush Holdback every **Six Months** with mineral spirits.

Important: If Holdback operates under severe dust conditions or twenty-four hours per day, **FLUSH EVERY THREE MONTHS.**

4. Flush with mineral spirits and relubricate before operating if the Holdback has been in storage or out of service for six months or more.

Temperature Range	Recommended Lubricant
+20°F to 150°F (-7°C to 65°C) (Max. permissible ambient temp.)	Mobil DTE Heavy Medium Shell Turbo Oil 68 High grade Automatic Trans. Fluid (ATF) Texaco Regal R&O 68 Chevron GST Oil 68 Exxon Terristic Oil 68 AMOCO Industrial Oil 68 Sunoco Sunvis Oil 931 Gulf Harmony
-10°F to +150°F (-23°C to +65°C)	Mobil Gargoyle Arctic C Heavy High grade Automatic Trans. Fluid (ATF) Texaco Regal R&O 46 Chevron GST Oil 46 Sunoco Sunvis Oil 921
-40°F to +150°F (-40°C to +65°C)	Mobil Jet Oil 2 Shell Turbo Oil 500 Exxon Turbo Oil 2389 Standard Esso Turbo Oil 2389 MIL-L-23699 or MIL-L-7808 Military Specification Oils

Ambient temperature below -40°F/-40°C consult Formsprag.

Storage

Formsprag LLH Holdbacks are shipped 3/4 full of oil and ready for operation. If the Holdback is to be stored for a long period of time (6 months to 2 years), it must be completely filled with oil (Mobil Gargoyle Arctic C Heavy) and stored under a roof at above freezing temperatures. At the customer's request, Formsprag will prepare the Holdback for storage in accordance with our Spec SP-194.

Flushing Procedure

1. Remove pipe plug from lower "Tee" in oil sight gauge and drain oil.
2. Reinstall drain plug.
3. Fill Holdback completely with mineral spirits or Kerosene.
4. Operate conveyor for one or two minutes to cause Holdback to overrun. This will circulate solvent for better cleaning of internal parts.
5. Remove drain plug and drain solvent.
6. Reinstall drain plug. Add oil to 3/4 full level as shown on the oil sight gauge.

Grease Lubrication – (No sight Gauge)

1. Grease lubricated Holdbacks, available by special order, are packed at the factory with Fiske Brothers Refining Company Lubriplate Low-Temp grease. Use no other grease unless specific recommendation has been obtained from Formsprag to use an alternate.

▲CAUTION Grease lubricated Holdbacks must operate in ambient temperatures of +20°F/-7°C or higher.

2. Do not attempt to substitute grease lubrication in a standard oil lubricated Holdback. The use of grease lubrication in Holdbacks intended for oil lubrication may cause a malfunction. To convert from oil to grease lubrication, a change of internal construction may be required which can only be accomplished by Formsprag Clutch. Consult the Formsprag Clutch Service Department and give clutch model number.

Grease Lubrication Maintenance

1. Lubricate Holdback every three months. If Holdback operates under severe dust conditions or twenty-four hours per day, grease monthly.
2. Use Fiske Brothers Refining Company Lubriplate Low-temp Grease only. (Do not use alternate greases without specific recommendation from Formsprag Clutch.)
3. Clean grease fittings by wiping with clean cloth.
4. Pump grease in with grease gun until fresh grease flows freely from around the entire seal circumference on both sides of the Holdback. Seals have been installed to provide automatic venting and to allow purging of old grease and dirt during regreasing. This will lubricate both clutch mechanism and auxiliary seals.

Sight Gauge Service (Ref. Figure 5)

- Sight gauge tubing (8) should be mounted on a vertical plane.
- Breather (10) must be above tube (8) and elbow (3) fitting.
- Apply a suitable pipe joint compound, such as Permatex #2 or equivalent, to the threads making sure sealant does not get into lube.

Replacement Oil Sight Gauges may be ordered from Formsprag. Simply provide Holdback model Number.

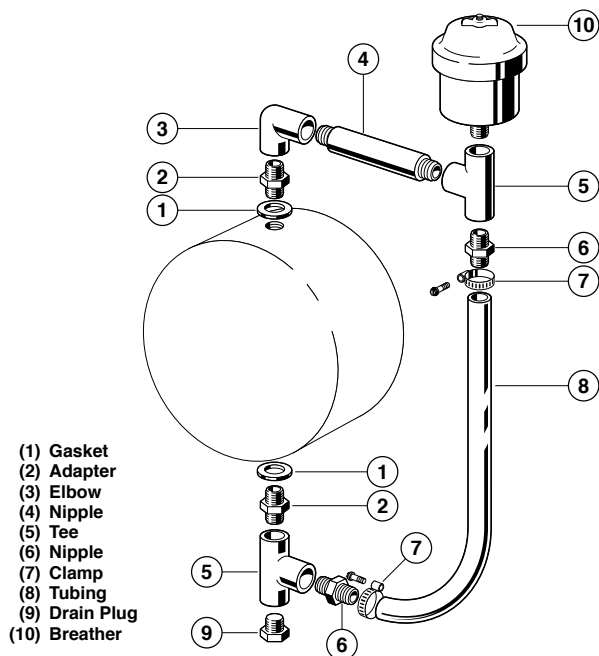


Figure 5
Oil Sight Gauge Assembly
CL-7362-5

Replacement Filter Elements

Keep adequate supply of filter elements on hand. They can be purchased from Great Lakes Filter Media Co., 5151 Lorraine, Detroit, Michigan 48208

To Clean Breather Filter Element

1. Loosen wing nut, lift off whole breather.
2. Remove cover and filter. Rinse filter in solvent.
3. Reinstall breather housing. Add clean oil to the mark on housing.
4. Reinstall cover and filter. Tighten wing nut.

Breathers

Clutch Model	Breather No.	
	Mfr. No.	Formsprag No.
LLH-700 Dry Filter	569022-01	CL-30703
LLH-750 to LLH-1027 Oil Bath Filter	FAOB-07	CL-30703-5

Clutch Rebuilding Service

Disassembly and Repair of Formsprag Clutches in the field is not Recommended.

Formsprag clutches are precision devices manufactured under careful controls to meet exacting standards. When reconditioning is required, clutches should be returned to Formsprag directly, through the Distributor, or through the Original Equipment Manufacturer.

Formsprag clutch and holdback are mechanical devices designed to protect mechanical equipment from rotation in the opposite direction and should generally not be considered Safety Devices. Formsprag clutches and holdbacks have surfaces which wear with use over time and as a result will need to be replaced. The clutches and holdbacks do not offer a feature for determining the time of their replacement. As a result the decision for the time of replacement must be made by the operator of the equipment based upon the specific application and performance of the clutch or holdback.

Packaging

Your Formsprag clutch, carefully wrapped in Vapor Inhibitor type activated paper for corrosive protection and packed in a shipping box conforming to the requirements of Rule 41, Uniform Freight Classification, may be stored for up to two (2) years and reshipped without added packaging.

These instructions cannot cover all details or variations in equipment and applications nor provide for every possible contingency which may be met in installation, operation or maintenance. Should further information be needed, contact Formsprag Clutch.

For additional technical and dimensional information on LLH Series clutches refer to Formsprag Overrunning Clutch Catalog P-956 or call Formsprag Application Assistance at 1-800-927-3262.

Rotating Equipment

Rotating equipment is potentially dangerous and should be properly guarded. The user should check for all applicable safety codes (in local area) and provide a suitable guard.

Warranty

Formsprag LLC warrants that it will repair or replace (whichever in its sole discretion it deems advisable) any product it manufactured and sold which proves to be defective in material or workmanship within a period of one (1) year from date of original purchase for consumer, commercial or industrial use. This warranty extends only to the original purchaser and is not transferable or assignable without Formsprag LLC's prior consent.

This warranty covers normal use and does not cover damage or defect which results from alterations, accident, neglect, disassembly, or improper installation, operation, or maintenance.

Formsprag LLC's obligation under this warranty is limited to the repair or replacement of the defective product. In no event shall Formsprag LLC be liable for consequential, indirect or incidental damages of any kind incurred by reason of manufacture, sale or use of any defective product. Formsprag LLC neither assumes nor authorizes any other person to give any other warranty or to assume any other obligation or liability on its behalf.



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