Formsprag Models FS 50 FD
For Dodge® Reducers TD, TDT, TXT

Installation Instructions

P-8628-FC

Formsprag Clutch®
Altra Industrial Motion

Introduction

The FS 50 FD series clutches are intended primarily for use as the built-in backstop for the ABB Dodge Shaft Mount Gear reducers models TXT, TDT and TD. They feature Formsprag's exclusive Formchrome sprags for longer life and durability.

- Formsprag FS 50 FD series clutches mount directly on the customers shaft.
  - o Some FS 50 FD units the shaft acts as the inner race.
  - o Some FS 50 FD unit the inner race is part of the backstop and slide onto the shaft with keyways.
- Formsprag FS 50 FD series clutches are held in place on the O.D. of the backstop by means of snaps rings or keys.
  - o Both Snap Rings and Keys are provided as part of the replacement kit.

⚠WARNING Failure to strictly follow then service and installation instructions set forth herein could result in severe personal injury or property damage. If for any reason you have a question because of reading these instructions or for any other reason not covered by these instructions, contact Formsprag Application Engineering Department before attempting to install the clutch into the reducer.

⚠CAUTION New Installation, maintenance or replacement of Formsprag FS 50 FD Backstops must be done with the reducer removed from the equipment.

⚠CAUTION Do not use lubrication of the EP type (Extreme Pressure characteristics) or those containing additives such as molybdenum disulphide or graphite. Use of these additives can cause the sprags not to function and cause failures to backstop the reducer.

Pre-Installation

Before installing the backstop refer to the information in Table 1 for the proper Backstop Kit Number that corresponds with the Dodge Gear Reducer being worked on.

If the Clutch you have on hand is not listed in Table 1, please contact Formsprag Customer Application Engineering Department for support.

The shaft on which the clutch is mounted must be supported by a bearing. FS 50 FD backstops are designed to be used with standard series bearings. The backstop's outside diameter tolerance is held to insure a proper fit (without pressing) in the housing bore. The tolerance on the housing bore should follow the bearing manufacture's recommendation.

TABLE 1: Formsprag Backstops for Dodge Shaft Mount Gearboxes									
Formsprag Backstop Kit Number	**Backstop Outside Dia.**	**Backstop Width**	**Backstop Keyseat**	**Gearbox Shaft Dimensions**	**TXT Reducers 1991- 2005**	**TXT Reducers 1985-1991**	**TDT Reducers**	**TD Reducers**	**Numeric Series**
CL4605-1FD	1.5725/1.5735	0.875	.125 x.06	.6310/.6315			TDT 115 TDT125	TDT 115 TDT125	No. 1
CL4605-2FD	1.848/1.849	0.880	.250x.13	.7383/.7378		TXT105 TXT109 TXT 115 TXT125	TDT215 TDT225 T11	TDT215 TDT225	No. 2 No. 3 No. 11
CL4605-7AFD	2.4385/2.4395	1.130	.250x.13	.9696/.9706			TDT 315 TDT325	TDT 315 TDT325	
CL4605-2-3FD	1.848/1.849	0.880	.250x.13	.7378/.7383	TXT309A TXT315A TXT325A				
CL4605-7A-1FD	2.4385/2.4395	1.130	.250x.13	.9696/.9706			TDT415 TDT425	TDT415 TDT425	
CL4605-6FD	2.4385/2.4395	1.000	.250x.13	1.1325/1.1335					No. 4 No. 5
CL4605-177-1FD	2.4385/2.4395	1.190	.250x.13	.8881/.8891					
CL4605-178FD	2.8322/2.8332	1.060	.250x.13	1.0511/1.0521	TXT405 TXT 409 TXT415 TXT425				
CL4605-179FD	3.1475/3.1485	1.440	.375 x .19	1.2140/1.2150	TXT509B TXT515B TXT525B	TXT509A TXT509 TXT515A TXT515 TXT525A TXT525			
CL4990-4FD	3.935/3.936	1.063	.375 x .19	1.5000/1.5005		TXT605 TXT609 TXT615 TXT625	TDT615 TDT625 T16	TDT615 TDT625 TDT615A TDT625A	No. 16A
CL4605-10FD	3.1475/3.1485	1.375	.375 x .19	1.2955/1.2965	TXT 505	T15			No. 6
CL4990-3FD	3.935/3.936	1.063	.375 x .19	1.5000/1.5005		TXT705 TXT709 TXT715 TXT725	TDT715 TDT725 T17	TDT715 TDT725 TDT715A TDT725A	No. 17A
CL4636-3FD	4.498/4.499	1.250	.375 x .19	1.7500/1.7505		TXT815 TXT825 TXT915 TXT926	TDT815 TDT825 TDT915 TDT926 TDT1115 TDT1125	TD815 TD825 TD815A TD825A TD915 TD1115 TD1125	No. 8 No.9 No. 18
CL40296-4FD	4.498/4.499	1.563	.375 x .19	1.7500/1.7505		TXT805 TXT1015 TXT1024 TXT1215 TXT1225	TDT1015 TDT1024 TDT1215 TDT1225 T18	TD1015 TD1024 TD1215 TD1225	
CL4605-5FD	2.4385/2.4395	0.960	.250x.13	.9696/.9706	TXT305A	TXT205 TXT209 TXT215A TXT225 TXT305	T12 T13		No. 13
CL4605-104-1FD	4.624/4.625	1.938	.500x.250	1.9360/1.9370		TXT905	TDT 1325 T19		
CL4605-105-1FD	6.500	1.938	.625x.31	2.7490/2.7495			TDT 1425 TDT1530		

New Installations

Shaft Size: (See Table 1) Refer to Gearbox Shaft Diameter for the size of the shaft required to properly fit the corresponding backstop assembly.

Shaft Hardness: the shaft extension must be carburized to an effective depth of .050-.060 inches after grinding and be hardened to Rockwell “C” 58-62. The core hardness of the shaft must be Rockwell “C” 28-40

Taper: Taper on the shaft and the housing bore must not exceed .0002 inch per inch.

Shaft Finish: The shaft must be ground to a diameter specified in Table 1 for corresponding backstops. The micro-finish must be 15-25 RMS.

Concentricity: The concentricity between the shaft extension and the housing bore that fits the outer race is CRITICAL. The T.I.R. (Total Indicator Reading) takes into consideration the effects of bearing end play as well as machining eccentricities. The T.I.R. on TXT 309B to TXT 1225 should not exceed .003”, while the T.I.R. on TDT1325 to 1530 should not exceed .004”. The base of a dial indicator can be mounted on the end of the shaft with the needle at the backstop bore in the housing. See Figure 1. Rotate the shaft sweeping the bore 360 degrees which will give the T.I.R.

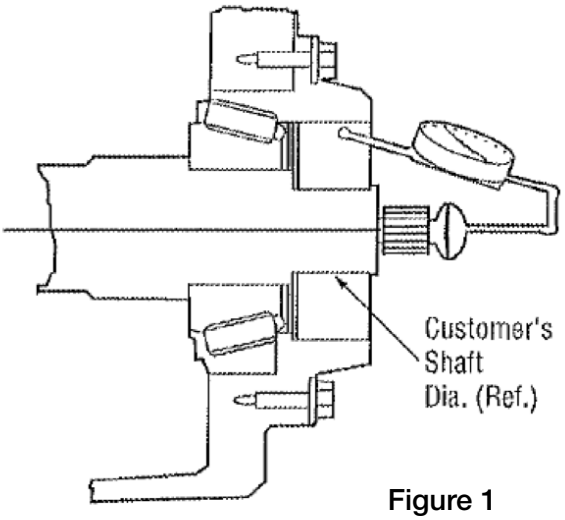

Figure 1

Shaft Endplay: If taper roller bearings are used, check the amount of end-play of the mounting shaft. The shaft end-play should not exceed .003 inches. End-Play is measured with a dial indicator at the end of the shaft. (See Figure 2) The base of the indicator is attached to the reducer housing. From the other end of the shaft an axial force is applied in both directions. IE: Push and Pull.

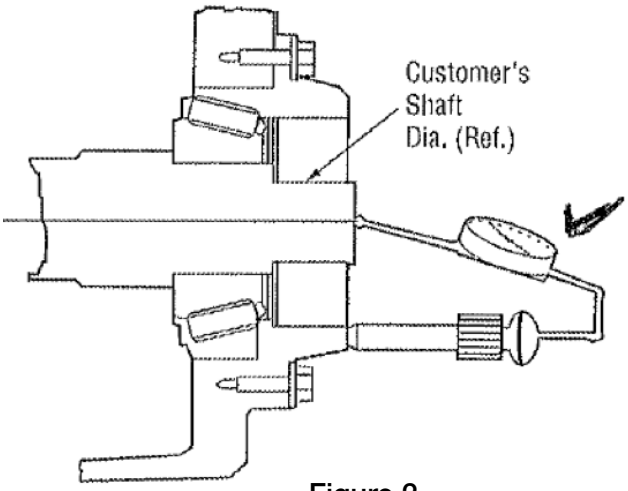

Figure 2

Key and Keyseat

Shaft Size: (See Table 1) Refer to Gearbox Shaft Diameter for the size of the shaft required to properly fit the corresponding backstop assembly.

Housing Keyseat: Refer to Keyseat (See Table 1) for nominal size of the keyseat in the O.D. of the outer race. The keyseat in the housing bore should allow for the line fit to .001: loose on the width dimension. The taper of the keyseat should not exceed.0002 inches per inch of length.

Hardness: Use only a hardened key, Rockwell “C” 30-40. Material to be AISI 1141, 1045, or 4130

Fit: Break edges of the key before installing to prevent any bearing at these points. The Key should be a line fit to .001 inch loose on the width dimension.

Length: The length of the key must be equal to the nominal width of the backstop. (See Table 1).

Rotation

Check the Application to determine in which direction the mounting shaft must rotate freely while in operation.

⚠WARNING To ensure drive does not unexpectedly start while removing the clutch, turn off and lock out/tag out the power source before proceeding. Failure to observe these precautions could result in injury.

⚠WARNING Removal of the clutch may cause unexpected machine movement. Remove or block all external loads before servicing unit. Failure to observe these precautions could result in injury.

INSTALLATION OF BACKSTOP

1. Opposite the end of the extended input shaft is the backstop cover plate. This must be removed to expose the shaft onto which the backstop will be installed.

2. Position reducer so that the exposed shaft is facing you. Carefully determine the direction of free or drive rotation needed. NOTE: Double reduction reducers (TXT 115 thru TXT1225 as well as TDT1325 thru 1530) will have the same rotation on the output shaft and the input shaft. Reducers with single reductions (TXT105 thru TXT905) will have the output shaft turning in the opposite direction of the input shaft. The direction of free rotation is critical for each reducer so that the backstop will function properly in the locked mode.

3. Each Backstop has an arrow showing direction of free rotation and this must be matched to the drive rotation of the shaft. After installation turn the input shaft to assure the backstop is installed properly in the drive / free rotation direction. If the input shaft does not rotate freely by hand, the backstop is installed in reverse and must be removed, reversed and reinstalled.

4a. **For Reducer Sizes TXT1A thru TXT5C and TXT105 thru TXT505A**

A light coating of gearbox oil applied to the O.D. of the backstop will aid in key installation into the housing. Rotate the shaft in the same direction as the arrow on the backstop. With the cardboard bushing still in the backstop, gently push the backstop onto the shaft. The shaft will push out the cardboard bushing that is holding the sprags in place. Everything should slide together; a hammer should not be used to install the backstop. If the backstop needs to be removed again for any reason, the cardboard bushing should be reinserted in the I.D. of the backstop to hold the sprags in place. Check the direction of free rotation to ensure the backstop does not bind up.

4b. For **TXT3B** a locking ring is required to position the backstop in the housing.

4c. **For TXT6A, TXT7A and TXT605A Reducers**

A light coating of gearbox oil applied to the O.D. of the backstop will aid in key installation into the housing. Rotate the shaft in the same direction as the arrow on the backstop. Some units come complete with an inner race that slides onto the shaft. Torque is transmitted through keys. Place keys into keyways before installing into the housing and onto the shaft. Once in place, install the small snap ring on the shaft then place the larger snap ring provided into the O.D. groove to hold the unit in the housing as an axial restraint.

4d. **For TXT8 thru TXT12, and TDT13 thru TDT15, and TXT705 thru TXT905**

Install the large snap ring provided into the I.D. of the reducer housing or into the backstop carrier. A light coating of gearbox oil applied to the O.D. of the backstop will aid in key installation into the housing. Rotate the shaft in the same direction as the arrow on the backstop. Some units come complete with an inner race that slides onto the shaft. Torque is transmitted though keys. Place the small snap ring provided into the rear groove of the shaft before installing the backstop. After the backstop is in place install the second large snap ring into the reducer housing. See Figure 3.

Note: Some reducer shafts require two keys. Extra keys may be provided in the kits. Install proper keys as needed. Keys should fit freely into respective keyways. Forcing a key into place may result in failure of the backstop.

5. Lubrication should be done per factory reducer specifications. If backstop is positioned above oil level, please consult Formsprag Application engineering for assistance.

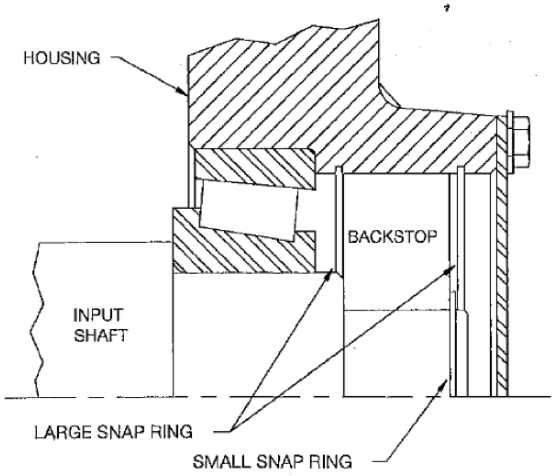

Figure 3 – TXT 8A, 9A, 10A

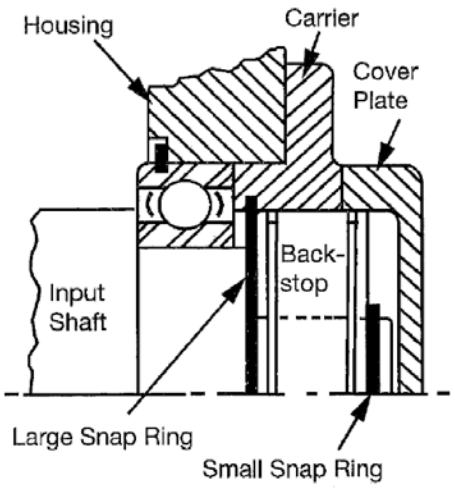

Figure 4 – TXT12, TDT13-15, and TXT805-905

Backstop Removal

1. Opposite the end of the extended input shaft is the backstop cover plate. This must be removed to expose the shaft where the backstop is installed.
2. Remove the snap ring from the shaft.
3. Remove the snap ring from the housing.
4. Insert a tool, such as a screwdriver, into the snap ring groove after the snap ring has been removed. Apply enough force to remove the backstop from the housing. A screwdriver on both sides of the Backstop will allow removal without pinching the backstop in the housing or on the shaft. Some Backstops have two holes on the outer race to aid removal. These are #10-24 threaded holes into which machine screws can be inserted to ease removal. Applying force to these screws instead of the snap ring grooves is preferred.
5. After Backstop removal on TXT1 thru TXT6, inspect shaft condition to ensure it is smooth and damage free.
6. In older TXT12 thru TDT15 reducers, the external backstop carrier should be doweled to the housing after concentricity is verified.
7. Please consult installation of Backstop to reinstall a new unit.
8. Lubrication should be done per factory reducer specifications. If a backstop is positioned above oil level, please consult Formsprag Application Engineering for assistance.

Lubrication

Proper lubrication and lubrication maintenance are the most important factors affecting backstop life.

Table 2 is a short list of recommended lubricants for FS 50 FD backstops.

FS 50 FD series backstops are shipped with a Rust Preventative coating. Lubrication must be present at the start of operation to prevent damage to the backstop.

If possible, FS 50 FD series backstops should be mounted below the oil level of the gear reducer.

If the backstop is mounted above the oil level a positive means of lubrication must be provided. Please consult Formsprag Application Engineering or the gear box manufacturer for recommendations.

Formsprag Clutch is not responsible for any changes made by lubricant manufacturers.

These instructions cannot cover all details or variations in equipment and application and cannot provide for every possible contingency which may be encountered in installation, operation or maintenance. Should further information be needed, contact Formsprag Application Engineering for assistance.

For Additional information on FS 50 FD backstops Formsprag application Engineering can be contacted at 1-800-927-3262

TABLE 2

Temperature	Recommended Lubricant
+20°F - +150°F	Castrol Perfecto T 68
	Chevron Regal R&O 68
	Mobil DTE Heavy Medium
	Petro-Canada Turboflo R&O 68
	Phillips 66 Multipurpose R&O 68
	Shell Turbo T 68
	Sunoco Sunvis 968
	DEXRON III ATF
-10°F - +150°F	Castrol Perfecto T 46
	Chevron Regal R&O 46
	Mobil DTE Medium
	Petro-Canada Turboflo R&O 46
	Phillips 66 Multipurpose R&O 46
	Shell Turbo T 46
	Sunoco Sunvis 946
	DEXRON III ATF

NOTES

Warranty

Formsprag Clutch 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.

Formsprag Clutch®
Altra Industrial Motion

www.formsprag.com

23601 Hoover Road
Warren, MI 48089 - USA
586-758-5000

Scan to visit the Backstops for Shaft Mount Gearboxes product page

P-8628-FC 1/19