Upgrading the Cummins Roller Clutch
By: Mark Mustard

When the Cummins diesel was offered in 1989 Dodge pickups, it could be purchased with either a manual transmission or a non-lockup 727 automatic transmission. The converter for the non-lockup 727 transmission was very similar to the 400 or AT540 converters, and had many internal likenesses. The converter's historic durability made it a good choice for this demanding application, but this converter also has some historic shortcomings.

One weak point has always been the spring retainers. The spring retainers' main job is to provide support to the springs that load the rollers of the roller clutch. This support not only regulates the amount of tension on the rollers, but also keeps the tension equal throughout the length of the roller. As the spring retainers wear, they move away from the rollers, lessening the tension on the rollers, and as the retainers weaken, they no longer stay parallel to the rollers. This allows the tension on the rollers to become uneven, causing the rollers to walk forward and come into contact with the stator cap.

Both of these conditions are bad, and replacing the spring retainer should be part of every overhaul. One way to improve the spring retainer is to affix it to the outer race of the roller clutch. This may be done by either brazing or TIG welding with a silica bronze filler rod. In either case care must be taken not to apply enough heat to reduce the hardness of the outer race (see Figure 1).


Figure 1

Another weak point of this converter is the manner in which the outer race of the roller clutch is held into the stator. The outer diameter of the roller clutch has a serrated edge and also has five lugs. The five lugs on the outside diameter of the roller clutch line up the five pockets machined into the stator. The roller clutch is a press fit into the machined cavity in the stator. This press fit keeps the clutch in position. Unfortunately, over time the roller clutch becomes loose in the stator. To fix this problem, remove the roller clutch from the stator. Place the stator in a CNC or manual vertical mill (Bridgeport™). Use a 3/8 end mill and machine five slots in the same place as the original slots so you are not removing any more material than you need to (see Figure 2).

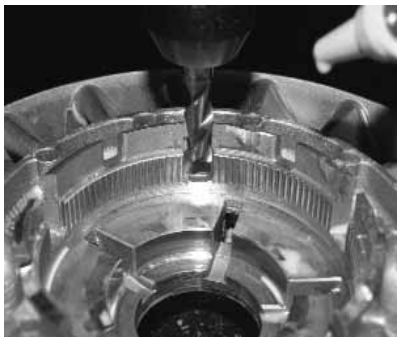
Figure 2

Heat up the stator in an oven or your bonder and at the same time place the roller clutch outer race in the freezer. Put a small amount of the 609 green Loctite™ on the outer diameter of the outer race, align the lugs with the new slots in the stator, and press the parts together. The lug will not fit the slot snugly, so position the head of your MIG welder over the slot and feed the wire into the space between the lug and the wall of the slot. Fill the void to the top of the cavity. The weld will stick to the race, but will not stick to the stator. Another option for upgrading the roller clutch is to replace it with the roller clutch from a GM 300mm converter (B85). (See Figure 3.)

The O.D. dimensions of the B85 roller clutch are the same as the Cummins roller clutch. The B85 roller clutch is .050" thinner and requires either adding a .050" shim under the outer race

or surface grinding .050” off the original Cummins inner race. The big advantage to using this roller clutch is that the spring retainer is built into the outer race. This eliminates all of the retainer-related problems and also makes the outer race thicker and stronger.

With the ever-increasing output torque of the Cummins diesel, upgrading the roller clutch is becoming a necessity.

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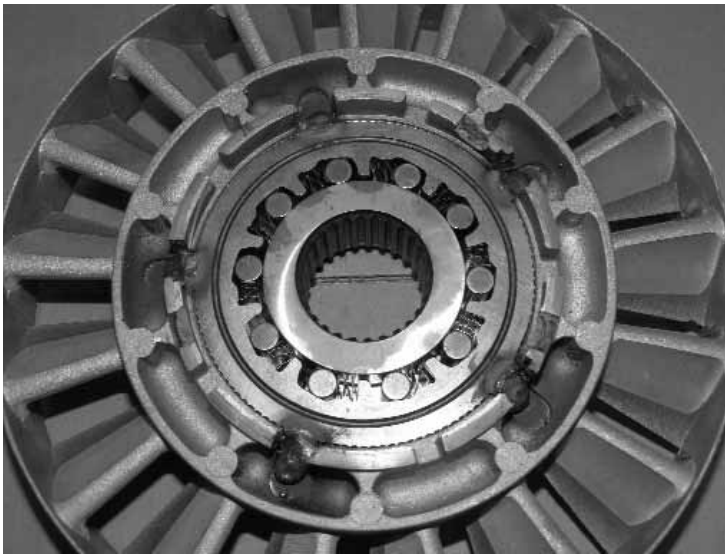

Figure 3
This Cummins stator with a B85 roller clutch shows where it has been MIG-welded at the end of the lugs to fill the void in the stator slots.