



**3rd and 4th Billet Upgraded Gear-set Shaft
Disassembly/Reassembly
Installation Manual**



Overview: Detailed instructions on installing the 3rd and 4th gear upgraded billet gear-set on the shafts. This does not detail how to remove the transmission from the car or the shafts from the transmission. See transmission disassembly/reassembly for removing the shafts from the transmission case.

Difficulty: Advanced

Time required: 3-5 hrs

Tools Needed:

- Press
- Gear removal tool
- Snap ring pliers
- Hammer
- Flat head screwdrivers
- Various cylinders to press components back on
- Service manual helps significantly
- **Patience**

In the box you should receive:

- (1) billet output shaft with 3rd and 4th straight cut into the shaft
- (1) billet 3rd gear, straight cut
- (1) billet 4th gear, straight cut
- (1) upgraded 4th gear retaining clip

Need Photo

Installation:

- 1) We are not responsible for damage to your vehicle by following this manual.
- 2) At this point the shafts are out of the transmission case and we can begin to remove all the components from the output shaft to place on the Velox Motorsports upgraded output shaft and disassemble the counter shaft that 3rd and 4th gears will go on. We start with the counter shaft.
- 3) We will begin by removing the counter shaft gear bearing. Remove the snap ring shown below.



- 4) Using a special service tool (or 90 degree 1/8" L-brackets), press the bearing off. The fit is fairly snug.



5) Remove counter drive gear's snap ring located below this bearing.



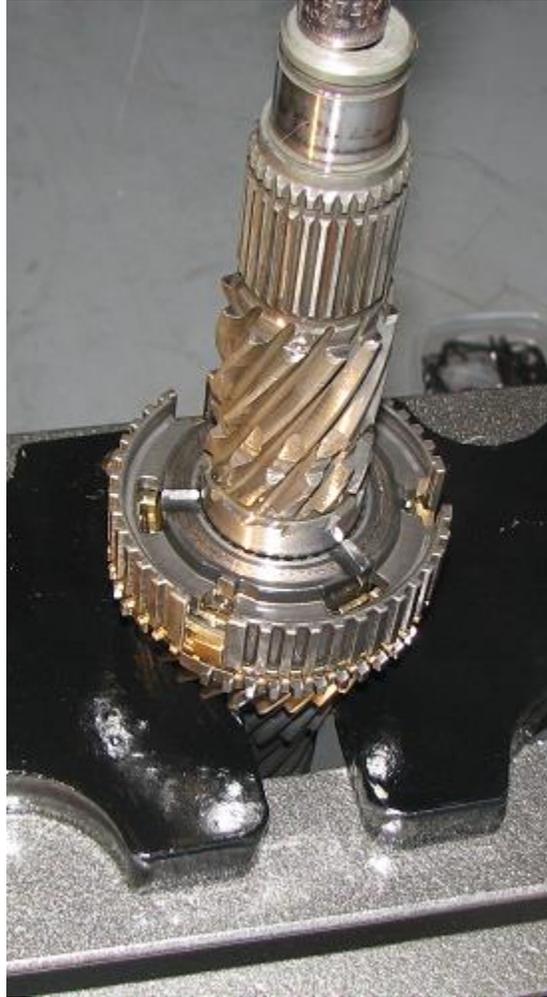
6) Remove counter drive gear from counter shaft.



- 7) Remove counter gear 4th gear retaining snap ring, clips, and washer.



- 8) 4th gear can now slide off the shaft. The inner portion rotates on the gear and 4th gear/synchro will come off as well. This does not require a press! A screwdriver may need to be used to get the inner portion to begin to turn.
- 9) Using a press, remove 3rd gear and the shift selector.



- 10) There are needle bearing beneath 3rd gear, oil these and place them on the shaft along with the billet 3rd gear cone. Place these units on the shaft along with 3rd gear synchro (preferably a new unit).

- 11) Place the transmission clutch/shift hub assembly on the shaft as well with the two rings on the shift hub facing up as shown below. Press this assembly onto the shaft. *Ensure that the synchronizer ring fits into the hub assembly while pressing this on, damage may occur to the synchronizer if it is pressed on incorrectly.*



- 12) Install 4th gear synchro oiled and billet 4th gear onto the shaft.
- 13) Oil the inner 4th gear bearing and install that by twisting it down 1st gear's teeth.
- 14) Install the upgraded thrust washer, half-moon washers, and the snap ring. The above steps are shown below.



15) Press on the counter drive gear as shown below.



16) Install counter drive snap ring as shown below.



17) Install front counter gear bearing as shown below. The snap ring groove points upward.



18) Install counter bearing snap ring on the freshly installed bearing. The counter shaft is finished and ready to go back in the transmission. Next up, output shaft!



19) Remove 5th / reverse gear's clutch/shift hub assembly's snap ring via snap ring pliers.



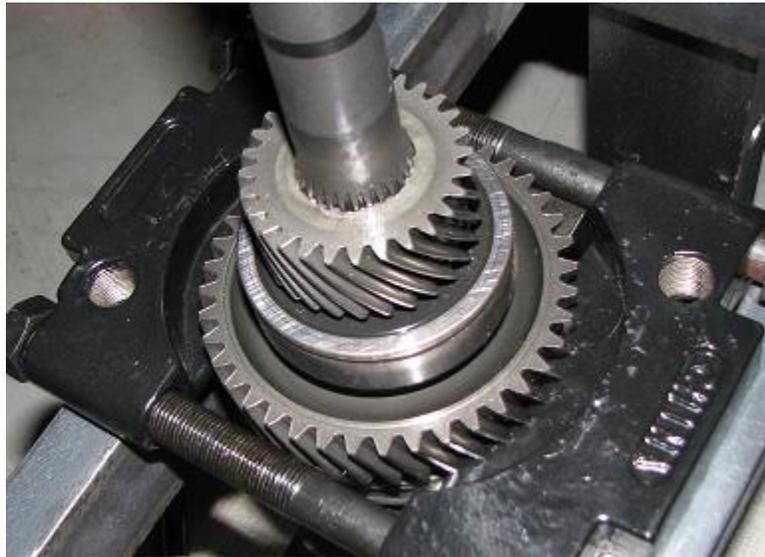
20) Press this shift/clutch hub assembly and reverse gear off as shown below. Remove the needle bearings as well.



21) Remove 6th gear's snap ring, shown below, with two screw drivers and a hammer.



22) We remove 6th gear, output bearing, and 1st gear in one step. This requires a bit more force but all three can come off at the same time.



23) There is a needle bearing below 1st gear, remove this and keep it with 1st gear.

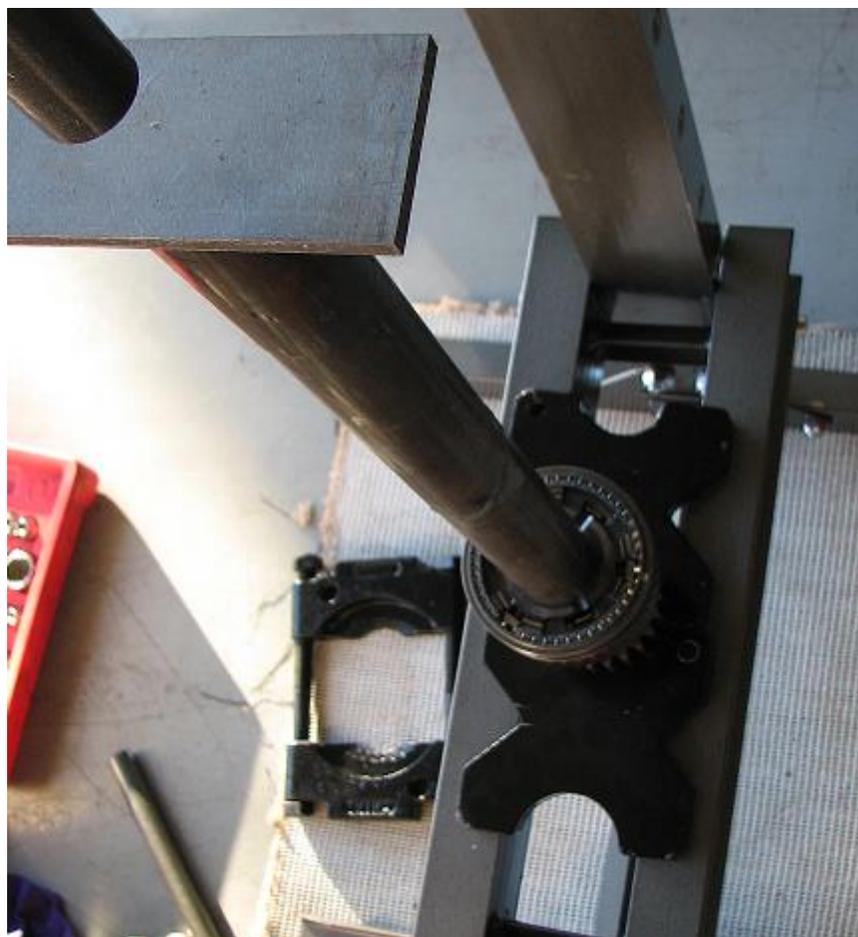
24) Remove 2nd gear and 1st/2nd clutch/shift hub assembly by pressing it off as shown below.



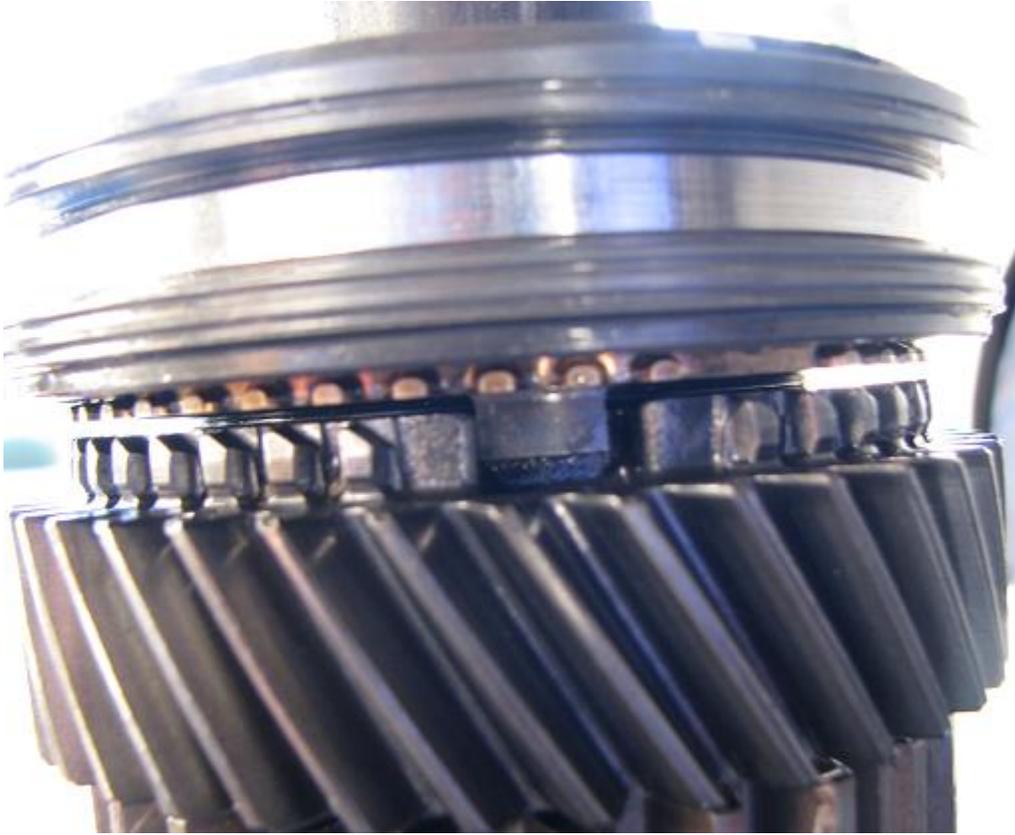
25) Below is a picture of the output shaft fully apart.



26) Time for re-install on the billet output shaft. Place 2nd gear's needle bearing (oiled) on the shaft, slide 2nd gear down on the shaft, 2nd gear synchro, and then the 1st/2nd gear shift/clutch hub. This requires a long special service tool as shown below.



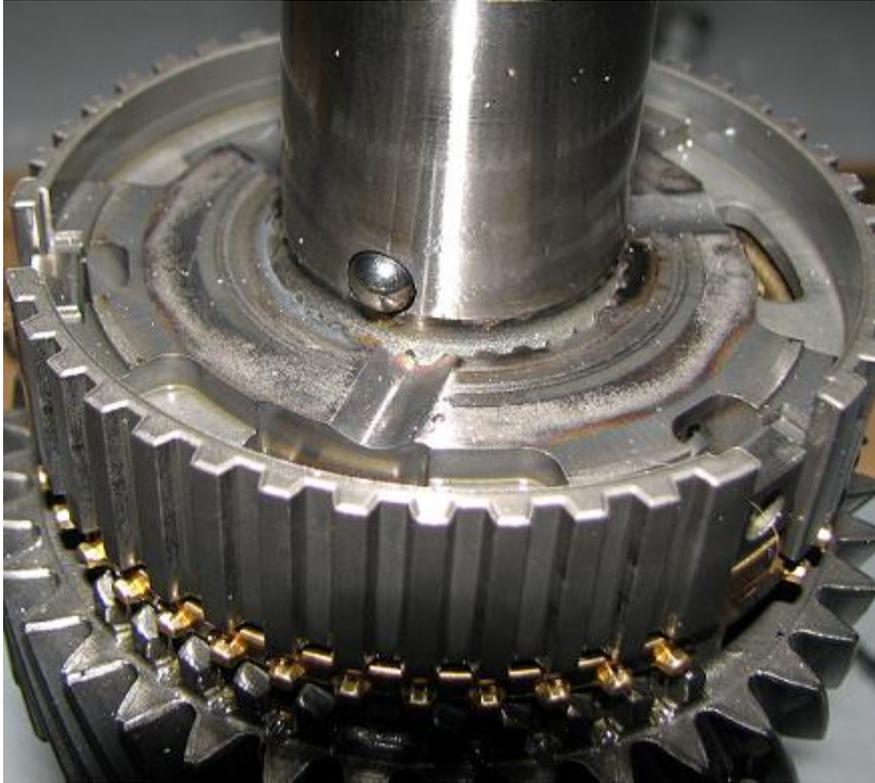
27) Note the orientation of the clutch/shift hub assembly is installed and how the synchro is placed on the gear. The synchro also needs to sit into clutch/shift hub, spin this until it all goes together well while slowly pressing the unit together.



28) Below shows a picture of 1st gear's synchro properly installed into the shift/clutch hub assembly, you need to do this for all synchros!



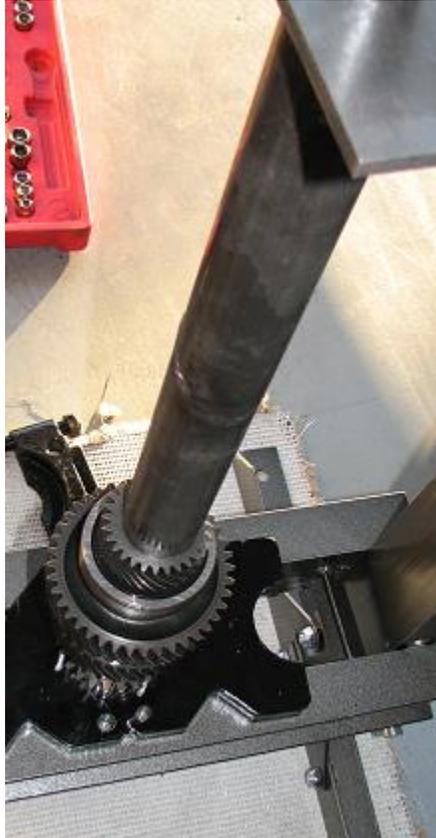
29) Install the 1st gear's shift restrict ball as shown below.



30) Install 1st gear by sliding it onto the shaft with the bearing assembly going on the inside. This will have to be spun to the correct location due to the shift restrict ball.



31) Install the output bearing and 6th gear by pressing them on.





32) Install the snap ring on the end of 6th gear.



33) Reinstall reverse gear, synchro, and reverse/5th gear shift/clutch hub assembly. Install the snap ring on the end of the shift/clutch hub assembly.



34) The shafts are both now fully assembled. Please return to the TL70 reinstall manual to finalize the install.