

Rear Main Seal Replacement

1. Disconnect battery
2. Serpentine belt:
 - a. Remove air plenum
 - b. Remove serpentine belt (15 mm)
3. Drain transmission:
 - a. Remove shift cable bracket (T40 Torx) (you may wish to wait until front drive shaft is removed first). I used a little antiseize just on the top few threads.
 - b. Remove pan bolts to drain, then replace. (You may want to wait until exhaust is removed first).
4. Front drive shaft:
 - a. mark, remove 4×11 mm bolts. (11 mm, 19 ft lbs)
 - b. remove clip from rubber boot; mark; push differential end of shaft up then pull out from transfer case to remove.
5. Rear drive shaft:
 - a. mark, remove 4×11 mm bolts. (11 mm, 19 ft lbs)
 - b. pull out from transfer case to remove.
6. Transmission mount:
 - a. Disconnect exhaust from exhaust manifolds. (15 mm, 39 ft lbs)
 - b. Support transmission.
 - c. Remove mount nut (15 mm)
 - d. Remove nuts/bolts securing support to frame. (21 mm, 52 ft lbs)
 - e. Raise transmission to release studs from support.
 - f. Remove support.
 - g. Lower until transfer case rests on cross member.
7. Exhaust Y pipe:
 - a. Disconnect O₂ sensors. Note: cable clips will release and slide out without having to pull bracket plugs.
 - b. Remove Y pipe (15 mm, 39 ft lbs)
8. Remove starter motor
 - a. Remove oil level sensor electrical plug.
 - b. Remove oil dipstick tube (15 mm)
 - c. Remove 2 bolts. (13 mm, 37 ft-lbs)
 - d. Remove plastic shield. (10 mm)
 - e. Tuck up and aside. (It will go, but it will take some wiggling around).
9. Transfer case:
 - a. Lower transmission slightly.
 - b. Remove transfer case shield.
 - c. Disconnect all electrical connectors:

	Remove the following: any cable clips can be removed by releasing a tab and sliding off the plastic base.
1.	Front propshaft speed sensor. Location: Front of TC, Driver Side
2.	Rear propshaft speed sensor. Location: Rear of TC, Passenger Side
3.	Transfer Case Encoder motor (C1) (Motor Control/Locking Solenoid Connector) Location: top of TC
4.	Transfer Case Encoder motor (C2) (Encoder Motor Connector) Location: front of TC, Driver Side
5.	Vehicle Speed Sensor Location: Rear of TC, Driver Side
6.	Vent tube
7.	Harness Bracket on top of TC

- d. Remove encoder motor (3×15 mm bolts) (This step is not necessary, and may cause leaks in the future if a new gasket is not used. If you use a good transmission jack, it is probably safe to leave the encoder motor on.)
 - e. Raise then support transmission on jack stands.
 - f. Support transfer case with transmission jack. Try to use some support that allows the transfer case to rotate and move around, but is not slippery. I made a wood deck to sit on the metal deck of the transmission jack.
 - g. Place catch pan before removing transfer case nuts.
 - h. Remove transfer case retaining nuts from transfer case studs. (37 ft-lbs)
 - i. Remove transfer case.
10. Transmission:
- a. Reinstall transmission cross member loosely to support transmission on mount.
 - b. Remove transmission heat shield (10 mm)
 - c. disconnect park/neutral position switch connector: use heat or remove entire module instead.
 - d. Remove main electrical connector (passenger side)
 - e. Remove torque converter access plug.
 - f. Mark flex plate to torque converter
 - g. Remove torque converter bolts.
 - h. Spin and push torque converter back into bell housing.
 - i. Support and secure transmission on transmission jack.
 - j. Remove front cross member and transmission cross member, lower transmission for easier access.
 - k. Remove bolt to fuel line bracket (left side)
 - l. Disconnect transmission oil cooler lines. There will be minimal drip, but you may wish to wrap lines with towel.
 - m. Remove bolts securing transmission to engine (8)
 - n. Lower transmission.
 - o. Disconnect transmission vent hose
 - p. Note routing of transmission dipstick tube then remove from below.
11. Rear main oil seal
- a. Mark flywheel position, remove (15 mm).
 - b. Remove rear cover (10 mm, 18 ft-lbs, lower pan-to-cover 108 ft-lbs).
 - c. Remove rear main seal, carefully prying from transmission side of cover. Clean mating surfaces thoroughly. Clean all threads.
12. Install Rear Main:
- a. Many seals contain PTFE. These seals must be installed DRY without any lube. PTFE on seal will transfer to metal of camshaft. Transfer of PTFE will not occur if any form of lubrication applied to camshaft. Thoroughly clean camshaft. Evenly tap seal into cover, make sure flush all around.

- b. Apply suitable RTV (oil resistant) to bottom corners where rear cover meets oil pan.
- c. Place rear cover so spacer fits onto camshaft. Begin to start cover bolts evenly from bottom to top. Slowly fasten until seated but not tight. Spacer should pop out and seal should be seated properly.
- d. Torque oil pan to rear cover 108 in-lbs.
- e. Torque rear cover bolts to 18 ft-lbs

Reinstall: essentially reverse of previous steps noting:

13. Flywheel
 - a. Install flywheel:
 - i. Clean old thread lock, then apply new thread lock.
 - ii. 1st pass 15 ft lbs
 - iii. 2nd pass 37 ft lbs
 - iv. 3rd pass 74 lb lbs
14. Transmission:
 - a. Install vent hose and hose clamp
 - b. Position transmission dipstick tube. Not routing.
 - c. Install transmission onto studs. If you have difficulty lining up the alignment dowels (as I had), get one of the lower bolt holes close and insert one of the starter motor bolts. Then you can wiggle the transmission closer into place. If working alone, you can use a ratchet strap between the adapter housing (rear of the transmission) to a solid cross member at the front of the truck). You will slowly be able to wiggle the transmission around and insert more bolts. Only tighten these by hand first until the bolt is fully engaged with the threads.
 - d. Install dipstick tube
 - e. Torque converter must spin freely by hand.
 - f. Install 6 studs + 1 bolt securing transmission to engine
 - g. Tighten to 37 ft lbs.
 - h. Tighten stud and bolt to 37 ft lbs.
 - i. Install torque converter bolts, tighten evenly in small increments to ensure torque converter is pulled forwards evenly (46 ft lbs).
 - j. Install torque converter access plug.
 - k. Install fuel line bracket, wiring harness to transmission
 - l. Install heat shield (13 ft lbs)
 - m. Install shift cable
 - n. Support transmission on jack stands.
15. Install transfer case
 - a. Ensure transmission mount is not installed, then raise transfer case to transmission using transmission jack.
 - b. 2
 - c. Connect vent hose/electrical connectors to transfer case
16. Install starter motor
17. Install but don't tighten exhaust pipe.
18. Install front drive shaft
19. Install transmission support (50 ft lbs)
20. Install transmission mount nuts (29 ft lbs)
21. Install transmission mount (18 ft lbs).
22. Install rear drive shaft
23. Connect oil cooler lines
24. Fill transmission and transfer case with fluid.