

DTR JL EZ 4CYL TRACTION CONTROL SYSTEM INSTALLATION INSTRUCTIONS

Part Number 28013

Thank you for purchasing this quality product from Nivel Manufacturing. The Traction Control System (TCS) you have purchased is designed to function much like a limited slip differential system. It does not provide an absolute differential lock, but transfers torque to the rear wheels equally, while allowing enough slippage to prevent steering issues normally observed with differential lock systems. (TCS - Patent pending)

Due to the size of this project, some steps have been abbreviated. It is recommended that you refer to your car manufacturer's service manual for detailed rear transaxle removal, disassembly, reassembly and installation instructions. Please read and understand all of these instructions before starting this project. The additional time required will help you to fully understand the full scope of the job ahead. Be sure to refer to the sections pertaining specifically to your brand of car.

CAUTION:

Always disconnect the negative (-) cable from the battery before beginning.
Always support your car on Jack Stands rather than a floor jack
Always wear eye protection when working on your vehicle.
Always clean up oil spills immediately and properly dispose of oil or oil soaked rags



Rear Transaxle Removal

1. Raise the entire car completely off the ground and support it with 4 jack stands placed under 4 solid points of the chassis. Leave the rear suspension unsupported. Remove the rear wheels and set them aside.
2. Remove the drain plug from the bottom of the gear case and drain the oil from the rear transaxle into a container. Next, remove the detent plug, spring and ball. See figure 2.

NOTE: Drained oil is considered a hazardous material and only proper legal disposal methods should be used.

4. Remove the drive belt and set it aside. Disconnect each of the rear brake cables from the rear brake assemblies, then remove the "E" clips connecting the brake cables to the rear cable brackets. You may want to secure these cables forward out of your way.
5. Remove the 4 bolts through the transaxle assembly, which secure the forward & reverse shift cable bracket and the accelerator cable bracket, to the transaxle gear case. Now remove the single nut securing the transaxle shift lever to the shift selector shaft and remove the shift lever.
6. Loosen the square lock bolt holding the governor arm on the governor shaft and lift this arm off and place it aside.
7. Disconnect the bottom end of the rear shock absorbers from the car and save the hardware for reuse. Then remove the single bolt holding the transaxle's front mount plate, to the aluminum engine mount.
8. Place your floor jack under the engine and remove the "U" bolts securing the rear transaxle assembly to the cast aluminum engine mount. See figure 3. Lower the aluminum engine mount onto some blocks to hold it up. Move a floor jack under the rear axle center gear case and raise it enough to hold the weight of the rear transaxle. Remove the bolts securing each leaf spring to the transaxle assembly. The rear axle assembly can now be pulled out from under the car.

Rear Transaxle Disassembly

9. Install the left wheel onto the left hub and snug the lug nuts to hold it in place. Tip the transaxle assembly up onto that wheel so that the opposite right axle shaft points upward. See figure 4.
10. Remove the remaining bolts holding the transaxle gear cases together. Make note of which bolts were in which holes, so they can be returned to their original position.
11. Grasp the right (upper) axle tube and use a mallet to dislodge the top (right) gear case half with the axle shaft still connected. Lift it carefully from the left (lower) case and make sure that all of the internal components remain in the left (lower) case. See figure 5.



Figure 1

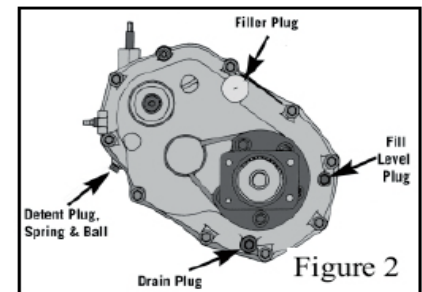


Figure 2

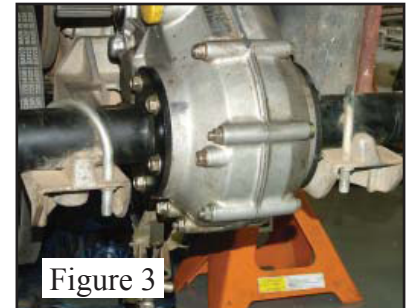


Figure 3



Figure 4

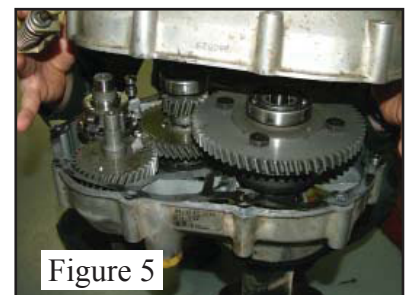


Figure 5

NOTE: It is not unusual for a shim or thrust washer to stick to the bearings in the right (upper) case half when it's removed. Check for loose washers and put them back onto the shafts they may have come off from.

12. Carefully lift only the ring gear & differential assembly and the intermediate gear assembly until the ring gear & differential assembly can be lifted from the gear case. See figure 6.

Traction Control System Installation:

13. Using a press or vise, gently compress the friction rings into the machined grooves on each outer face of the TCS case halves. Use care to assure each is positioned correctly before installation or damage to the friction rings will occur. See figure 7.
14. Remove the 4 bolts holding the ring gear and the two differential case halves together. See figure 8. Remove the ring gear to separate the differential halves. See figure 9.

NOTE: Some of the next few picture may appear different from your differential. While the pictures may differ, the process is the same for you're installation.

NOTE: As you disassemble the differential, be sure to track the location of each thrust washer so that it is returned to it's original position during assembly.

15. From the outside, drive the roll pin (which secures the spider gear shaft) inward. You will need a small 5/32" pin punch. DO NOT attempt to drive the roll pin out the differential case, it must be driven inward. See figure 10.
16. Slide the spider gear shaft out of the case. Watch closely for any thrust washers or shims behind these gears as they may fall out during this operation. See figure 11.

Tech Tip: To maximize the effectiveness of the TCS, you can surface the portion of your side gears, which will mate with the TCS friction surfaces. Grind away any irregularities and leave a flat , scuffed surface for the friction material to operate against. See figure 12.

17. Place one of the TCS case halves (friction surface down) on top of the bottom side gear and between the spider gears. Then place the four large springs into the spring pockets on the back face of the TCS. Insert the four small springs into the inner diameter of the large springs and place them into the 4 spring pockets. See figure 13.
18. Slide the spider gear pin back through the differential case, through the spider gears & thrust washers and above the TCS case half. Insert the roll pin from the inside, to lock the spider gear pin into place. See figure 14.

NOTE: When reinstalling gears, pins, or thrust washers into the differential coat the spider gear pin, all gear tooth and thrust washer surfaces with fresh gear oil.

19. Place the other half of the TCS case half onto the springs. Then place the top differential case & ring gear with installed side gear, onto the friction surface of the TCS body. See figure 15.
20. Make sure the ring gear bolts and their mounting holes in the differential case are cleaned with spray brake cleaner, rubbing alcohol or a Lock Tite "Clean-N-Prime" chemical.
21. Place the entire assembly in a press or vice.
22. Check to make sure the spider gears are correctly aligned, then compress the differential assembly making sure the internal gears and the bolt holes through the ring gear, upper and lower differential case halves are correctly aligned.
23. With the assembly compressed, install the ring gear bolts using the Red grade of Lock Tite or similar thread locking compound. Snug the bolts down in a crisscrossing pattern, then torque the ring gear bolts to 45 ft/lbs.

Rear Transaxle Assembly

24. You will need to clean the old gasket from the gear case surfaces before assembly.

NOTE: Use a hair dryer on the highest heat setting to heat the old gasket. Once warmed sufficiently, it will cleanly & easily peel from the gear case without having to scrape it free. USE CARE to prevent nicks or gouges to the gasket surface while cleaning.

25. Lift the intermediate gear assembly just enough that the ring gear and differential assembly can be returned to its original location in the transaxle. Check to make sure that any thrust washers and parts displaced during assembly are correctly in place.
26. Place the new gasket included in this kit (PN GSK EZ0 26822) onto the left (lower) gear case, then place the right case over it and begin the assembly.

NOTE: If the case does not slide freely all the way together into position, do not force it. You may

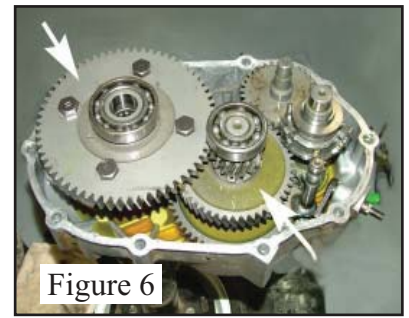


Figure 6

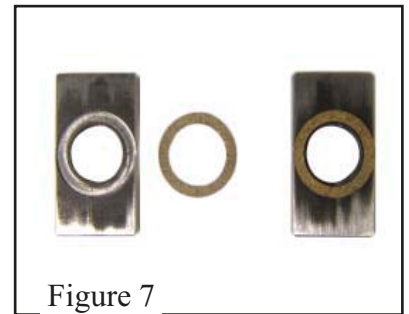


Figure 7



Figure 8

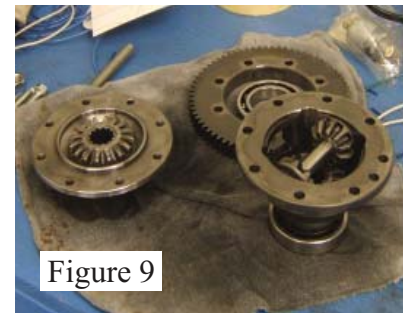


Figure 9

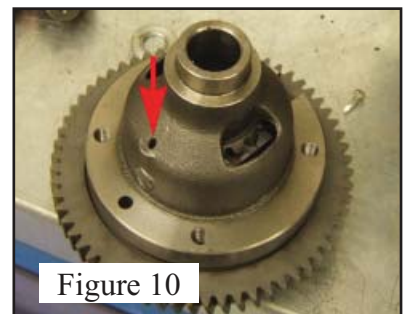


Figure 10

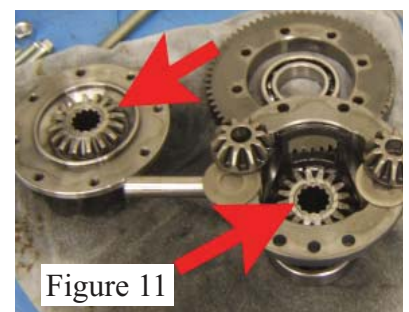


Figure 11

have to pull it back off again to recheck that all components are correctly in place.

27. Install the gear case bolts removed in step 10 above and make sure the bolts are returned to their original positions. Tighten the case bolts in a crisscrossing manner, to 15 to 18 ft/lb. Install the detent plug, spring and ball. Install the gear case drain plug. See figure 2.
28. Insert the rear transaxle assembly back into position in the car; then reverse the order of disassembly.
29. Once the car is back on the ground and on a level surface, remove the oil fill level plug (just behind the right axle at the gear case). Remove the rubber filler plug and add the appropriate amount of 90 wt. gear oil until oil trickles from this fill level bolt hole, then install the fill level check bolt. See figure 2.

SERVICE NOTES

Oil Change Intervals:

Most factories recommend changing the rear axle assembly oils somewhere between 2 to 4 years. The friction surfaces in the TCS unit will wear over time releasing "dust" into the transaxle oil. The friction materials used in the Nivel Manufacturing TCS kit are specifically designed to operate in oil and will not compromise the **effectiveness** of the lubricant. You will notice after breaking in the TCS the transaxle oil will develop a green tint. This is normal and it is not necessary to change the oil. It is recommended to inspect the condition of the transaxle lubricant after the initial six months or one hundred hours of operation and replace. Change transaxle oil annually thereafter.

TCS Removal for Rebuilding:

The TCS unit can be rebuilt by replacing the two friction rings. Should you need replacement friction rings for your car, order part number DTR CC 1601.

1. Use the instructions above for removal and for reassembly.
2. Once the TCS unit is removed from your **differential** assembly, the friction rings can be pried from the TCS housings, using a small flat blade screw driver.

NOTE: Be sure to clean the friction ring grooves, but use care to prevent enlarging of the ring groove. The new friction rings must fit tightly into each groove.

3. Completely clean any oil residue off of the TCS halves.
4. Using a press or vise, gently compress the friction rings into the machined grooves on each outer face of the TCS case halves. Use care to assure each is positioned correctly before installation or damage to the friction rings will occur.
5. Reinstall the TCS into the **differential** by following the steps listed above under Traction Control System Installation.

TCS Operation

The Nivel Manufacturing Traction Control System is a passive system, designed to transfer power to the wheel with the most traction in slippery driving conditions. There are a few tricks you can do as the operator of the vehicle to improve the performance of your TCS unit.

Traction is directly proportional to the amount of weight located above each wheel. If you incur excessive wheel spin, try shifting your weight over top of the spinning tire. Having two individuals riding in the car or a single operator sitting in the middle of the vehicle will provide the most even weight distribution and will result in optimal TCS performance.

Should one rear wheel ever come completely off the ground and begin to spin freely, you can lock the TCS unit to deliver extra power by torque braking the vehicle. Press the accelerator and the brake together, balancing the pressure between the pedals until the vehicle begins to move. If the drive train does not make enough power to move the vehicle, be extremely careful as prolonged stalling of the engine or motor can cause overheating and damage. On modified cars producing enough torque for extreme off road conditions, this technique will allow the vehicle to traverse most any obstacle.

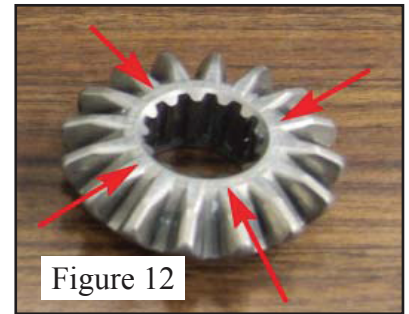


Figure 12

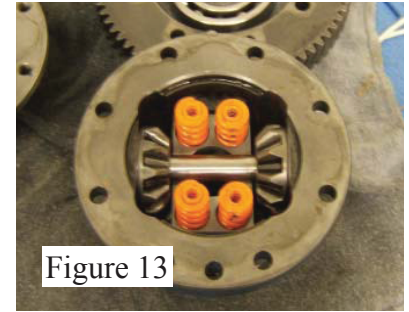


Figure 13

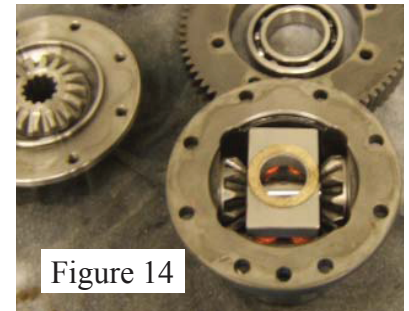


Figure 14

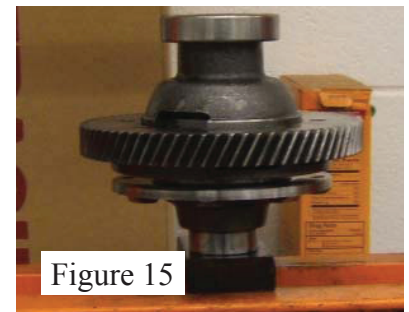


Figure 15