An Inside Look At The New Process 242 Transfer Case

By Mike Weinberg
Contributing Editor

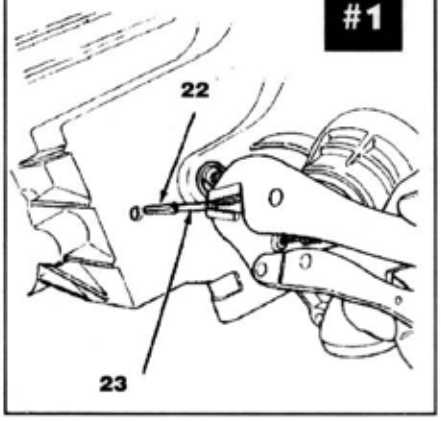
There was a time when 4WD vehicles were almost exclusively found in work environments. Farmers, ranchers, construction firms, outdoorsman and snow-removal people made up the bulk of 4WD users. Throughout the '80s, 4WD and all-wheel-drive grew ever more popular in cars and trucks whose owners never thought about offroad use. As with all other components of the modern day automobile, 4WD technology has continued to become more complex and sophisticated. Greatly increased use of electronics and refined transfer-case technology have brought lighter, more efficient and quieter transfer cases to the market. The New Process 242 is a product of this evolution.

Found in top-of-the-line Jeep Wagoneer and Cherokee models, the NP242 is designed to function to the expectations of buyers willing to invest upwards of $30K in an offroad-capable vehicle. The 242 is an aluminum-cased unit with a five-position shifter. This unit is equipped with a positive displacement gerotor-type oil pump like its close cousins, the 231 and 241 t/cases. The five-position shifter provides 2W high, 4W part-time, 4W full-time, neutral, and 4W low operation. The 242 is equipped with a torque-sensitive interaxle differential. This allows the unit to differentiate torque between the front and rear axles in the 4W full-time position. The 4WD part-time and 4W low have the t/case differential locked to provide torque equally to the front and rear axles. The 4W low position gives the unit a gear reduction of 2.72-1 for serious offroad use.

Remove the small seal plug from the low-range fork lockpin access hole. Then move the shift sector to align the low range fork lockpin with the access hole.

Remove the low-range fork lockpin (22) with a size number one easy-out tool (23). Grip the easy-out tool with locking pliers and remove the pin with a counter-clockwise, twist and pull motion.

#1



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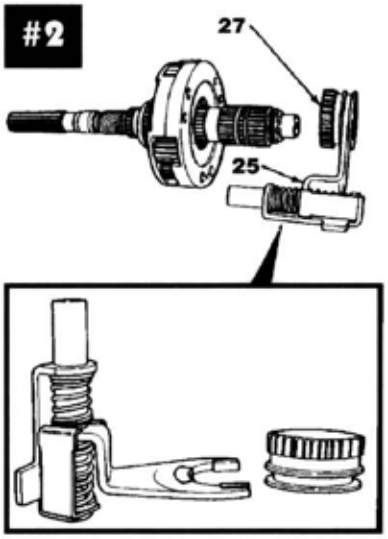
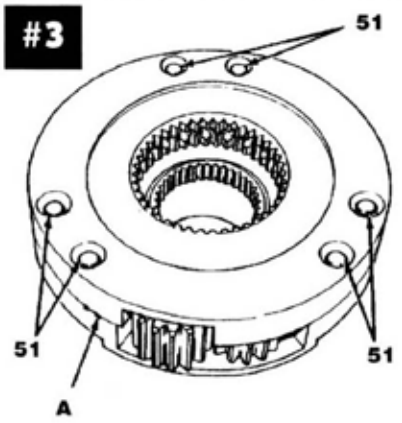


Remove the mode shift sleeve (27) and mode fork assembly (25) from the mainshaft. Note position of the mode sleeve in the fork and remove the sleeve.

#3



Disassemble and inspect the differential as follows:
• Mark (A) the two differential case halves with a scriber for assembly reference.
• Remove the case attaching bolts (51) and remove the upper case. Use the two slots in the case halves to pry them apart.
• Remove the planet gear thrust washers and remove the planet gears (52) from the pins on the lower case.

Now, Listen Up!

The dealership sales people are notoriously lax about explaining to buyers how this transfer case works. If you are working on one of these units and intend to warranty your repair, it is absolutely critical that you understand the operation of this unit so that you can make sure your customer knows how to use it properly. The 4W part-time and 4W low positions are intended for offroad operation. The 4W full-time position is for use on paved roads at normal operating speeds when weather conditions cause the driver to need extra control and traction. The transfer-case differential only works in the 4W full-time position. Because of this differential, 242 transfer cases have some unique diagnostic problems which will make you see red rats if you are not familiar with this unit.

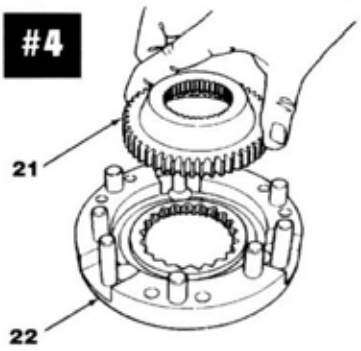
Noise

These units are quieter than their ancestors. 4W low position normally is noisier than other ranges due to gear reduction through the planetary, but noise in all ranges is an indication of lack of lube or internal damage.

Lube

These units are filled with 2.5 pints of Mercon ATF or Dexron II. That is not a whole lot of lube capacity. There is NO such thing as a "small" leak in this unit. If this unit runs low on oil for any period of time, it will look like the parking garage in the World Trade Center. Tolerate no drips in this box.

#4



Assemble the differential as follows:
• Lubricate the differential components with automatic transmission fluid.

• Install the mainshaft gear (21) in the lower case(22).

Shift problems

Typical complaints are locked in 4W part-time, won't shift past 4W part-time. Many times after prolonged use in 4W operation on hard roads, the unit will get spline locked by torque load. Simply getting into reverse for a 100 feet is enough to free things up. If this doesn't work, check the external first. Stifle the urge to take this unit apart. The units will hang up on a 4W shift on the fly because the owner hasn't released the throttle to unload the torque so the unit can complete the shift. If the unit will not shift past 4W part-time, look at the tires first. A difference of as little as 3 lbs. of pressure will tie this unit up. Equalize the tire pressures first, and make sure all tires are the same size. Inspect the tires for excess wear. If the fronts or rears are worn badly, try splitting the worn pair, one to the front and one to the rear. It may be necessary to check the tire stagger (outer-tire circumference) with a measuring tape. Even though they come from the same mold, tires grow to different sizes when inflated.

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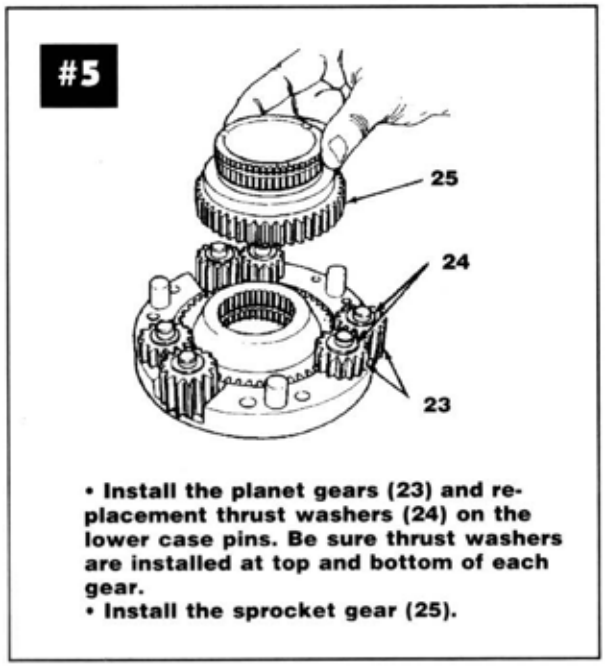

• Install the planet gears (23) and replacement thrust washers (24) on the lower case pins. Be sure thrust washers are installed at top and bottom of each gear.
• Install the sprocket gear (25).

Overhaul And Inspection Fine Points

When you separate the cases on a 242, you will notice many similarities with the 231 and 241 units. After removing the rear case, oil pump, drive sprocket, chain and driven sprocket, it will be necessary to move the shift sector to line up the low fork-lock pin with an access hole in the case, near the shifter. A #1 easy out and a pair of vise grips will free the roll pin (See Figure 1). Next, pull out the shift rail and remove the mainshaft and the mode fork together (See Figure 2). Mark the mode-sleeve position for easy reassembly. Looking at the nose of the mainshaft, remove the intermediate-clutch-shaft snap ring and thrust washer, and remove the intermediate-clutch shaft from the mainshaft. Looking into the differential, remove the retaining snap ring. Before you remove the differential from the mainshaft, get ready to catch the needle bearing and two spacers before they hit the speedy dry under your bench.

Before you take a wrench to the differential assembly, make index marks on the case halves or it won't go back together and work (See Figure 3). The differential is essentially a planetary with two sun gears. The top one is the sprocket gear and the bottom one is the mainshaft gear (See Figure 4). Note their relative positions, as well as the thrust washers for easy assembly (See Figure 5). If the teeth on the mainshaft gear or the brass ring under it are damaged, replacement will be necessary. If any other parts of the differential are worn, replace it as a whole assembly.

The rest of this unit is the same design as a 231/241. If the annulus gear is damaged, you will need to buy a front-case half as it is not removable. Careful repair will produce a quiet, smooth-shifting unit. Understanding the operation of the t/case and making sure the driver knows how to use it will ensure that it will provide good service and profit for the shop. ■