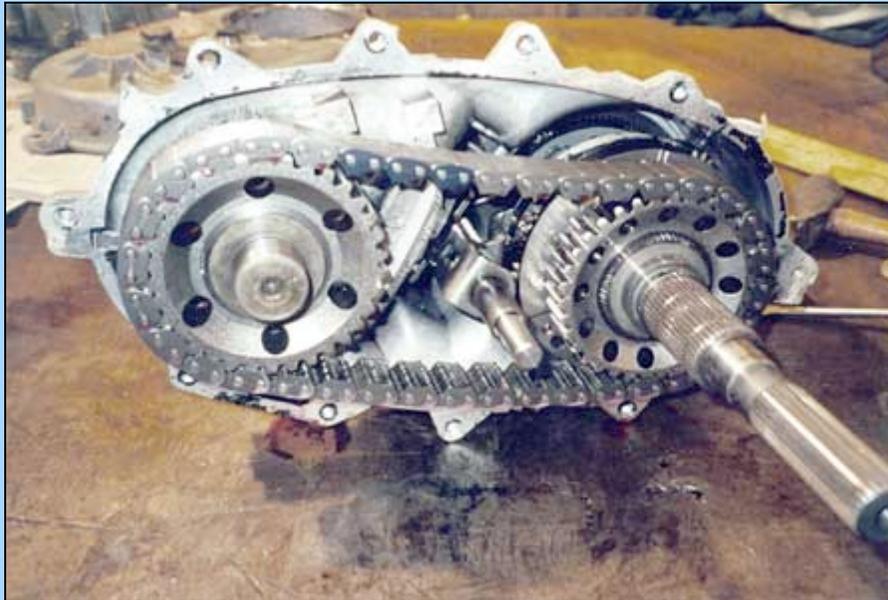


Transfer Case Issues, Inspection & Rebuild

by Tony Bartol
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The HUMMER transfer case is a New Venture Gear 242. Some owners have reported problems with their transfer cases and a bunch of them have been damaged in use. Most of the problems I am aware of are related to the cooling circuit, a plug, the chain, the differential gears and oh yes, Driver habits. I've had the "opportunity" to witness some of the problems, so I'll tell you what I know and think.

There are differences in the transfer cases from some years to others. I won't get into those differences in this article because I don't know ALL of the differences.



COOLER RELATED FAILURES:

The T-case is cooled by the transmission fluid running through a heat exchange loop inside the Transfer case. The hot transfer case fluid gives up it's heat to the outside of the heat exchanger and the transmission fluid running inside the heat exchanger carries the heat away to be rejected to the air in the transmission fluid cooler above the engine radiator. The fluids are the same, but do not mix under normal conditions. The problem is when the heat exchanger cracks and allows transmission fluid into the transfer case. This has been called the "vampire" since it sucks the blood (ATF) out of the transmission. The transmission fluid fills the transfer case and then goes through the vent tube to the air cleaner. The boot in the air cleaner should let it out onto the ground. As with any leak, investigate where it is coming from as soon as you see it to avoid bigger trouble. If you see red fluid below the air cleaner, check your transmission fluid level before driving any further! If the transmission seems to "slip", check

the fluid immediately. If enough Automatic Transmission Fluid (ATF) gets out of the transmission, it can be damaged. Read "BIG \$". The cooler connections are above the front output shaft connection to the front driveshaft.

In my opinion, the cracking of the heat exchanger inside the transfer case could be caused by improper torquing of the exchanger connection nuts. Holding the ends of the tubes inside the case while the nuts are torqued on the outside of the case will eliminate this possible source of stress on the exchanger. It is also important to make sure the locating lug on the exchanger is properly engaged with the notch in the case. Doing both of these things should minimize the possibility of exchanger stress and movement which may lead to cracking and the "Vampire". Some transfer cases may also run at high temperature, indicating that the cooling loop does not remove enough heat for all driving situations. Some HUMMER owners have installed temperature sensors to determine this. I have not, but I do believe the cases can run hot. I have measured temperatures above the recommended ATF temperature with outside air temperatures of 30 degrees. If you drain the ATF from the transfer case and it is anything but clear, bright red, the case is either contaminated or has run hot. I believe changing the ATF after every long trip or hard run is a good idea. Only a minority of HUMMER owners report this problem.

Some owners have devised external cooling loops that use an added external pump and heat exchanger to eliminate the heat exchanger inside the case and provide more cooling capacity. Some are reported to work very well. Others have problems. None of them has documented their system well enough for me to duplicate it here.

THE PLUG RELATED PROBLEM:

There is a rubber plug above the shift lever shaft on the front of the case that has fallen out for some people. AM General issued a letter to those with cases that had a problem. A new plug material is used. The new plug is part number 05938682 and it is sealed in place. If the plug falls out, ATF can leak out or water and mud can leak in. My advise is to check the tightness of the plug at every oil change and before every off road run. On cases I rebuild, I replace the rubber plug with a dash 4 size, threaded, internal hex, SAE plug which has an o-ring seal. These are available from hydraulic supply vendors and some large truck shops. This cannot be done with the case installed since metal chips could get inside the case from the drilling and tapping. I believe this is the best long term solution. Other threaded plugs could be used also.

CHAIN RELATED PROBLEMS:

Torque is transferred from the main shaft in the t-case to the front output shaft via a "silent" or timing type chain and sprockets. Over time, the chain and sprockets wear and thus the chain gets longer or "stretches". Eventually this would get bad enough that under high torque situations (when you have your foot in it), the chain might jump on the sprockets, or it could break. If the chain jumps or breaks, it can get caught between the sprocket and the case, punch a hole in the case and let all of the blood (ATF) out. Obviously this would wreck your day! Another problem with a loose chain is that it may hit the transfer case oil pump pickup tube and wear a hole in it. The transfer case has it's own oil pump to circulate ATF in the case for proper lubrication. There is a screen near the drain plug and a tube from the screen to the pump. The tube runs right next to the chain. If this tube gets a hole worn in it, the oil pump

will draw air, not oil and some parts of the t-case will not be lubricated. The oil pump will also be destroyed. You may not notice this failure until most of the t-case is junk. I removed the t-case from my '94 soft top while I was replacing the engine. It is easier with the engine removed because you can just drop the transmission and t-case as a unit and separate them out of the truck. Nothing seemed wrong, but I wanted to look inside since the '94 had 76,000 miles on it. Good thing I did because the chain had almost worn through the pickup tube. I replaced all of the seals, the chain and the sprockets, and put it back together. I also replaced the differential pinion gears, but I'll talk about that in the next section. It was an easy job. It would have cost me a lot more if I hadn't looked.

DIFFERENTIAL PROBLEMS:

The transfer case has three "modes"; H (high range, differential unlocked), HL (high range, differential locked) and L (low range, differential locked). In "H", the differential inside the t-case allows the front and rear driveshafts to turn at different speeds. This results in better on road handling. When more traction is required off of paved surfaces, the t-case should be in HL or L. In HL or L, the differential is not operating and the torque is carried by pinion gears in the differential. Many transfer cases have failed when the differential pinion gears broke. The pieces frequently get caught between the chain or differential case and the t-case casting. When this happens, the case usually breaks and all of the oil gets let out. Again, this makes for a bad day. My '93 HUMMER had this happen the first week I had it. Stronger differential pinion gears were used from 1998 on, part number 05744880. The stronger pinion gears will fit in the earlier cases.

I replaced mine when I rebuilt the '94 case and suggest that if you have your t-case apart, you use the stronger pinions also. This was an easy install also.

Cost is minimal. I'll be rebuilding my '93 case soon since it too has about 80,000 miles on it.

I suggest replacing the chain, sprockets and seals at no more than 75,000 miles based on my experiences and what I have heard. Also replace the differential pinions if the HUMMER is earlier than a '98. This is a judgement call. You need to decide for yourself when things need to be checked, rebuilt or upgraded. Some people have had problems in the first 500 miles (me). Other have had no problems in 160,000 miles. You must decide. I'm offering my opinion. The HUMMER repair and parts manuals do an excellent job of explaining and showing how to inspect and repair the t-case.

Driving habits make a big difference, too. If you get tire(s) spinning and then hit the brakes, or the spinning tire gets traction suddenly, the load on the drivetrain, including the t-case, can be HUGE since the HUMMER is a heavy vehicle. Locking differentials can also increase loads on the drivetrain due to torque windup or shock loads. Loads vary by type of locking differential and driving habits. In short, run with differentials unlocked whenever you don't need the traction and avoid shock loads. Unlock ARB equipped differentials frequently to avoid torque windup.

No amount of preventive maintenance nor the stronger differential pinions guarantee that you won't break something, but the possibility is reduced. I've seen and heard about many, stronger '98 t-cases damaged too.

My plan is to not spin the tires unless I'm in mud. Now, if I could just listen to my own advice.....

Hope this helps!