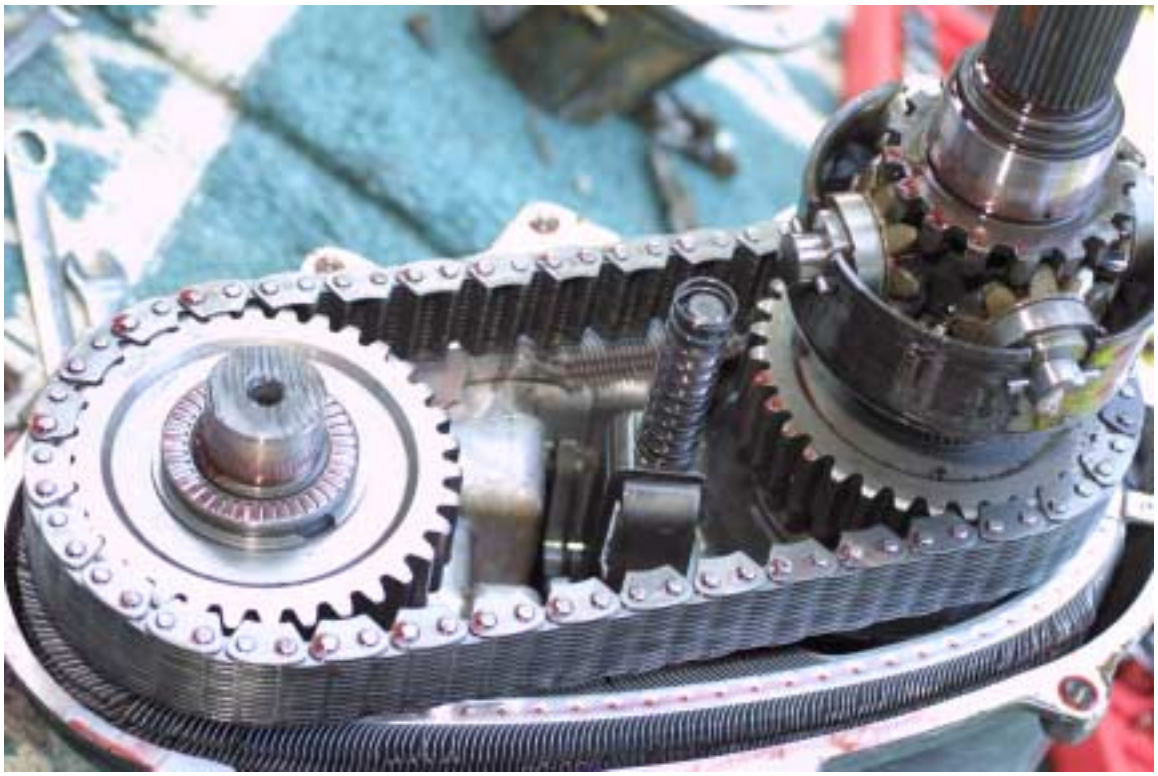
INTRODUCTION

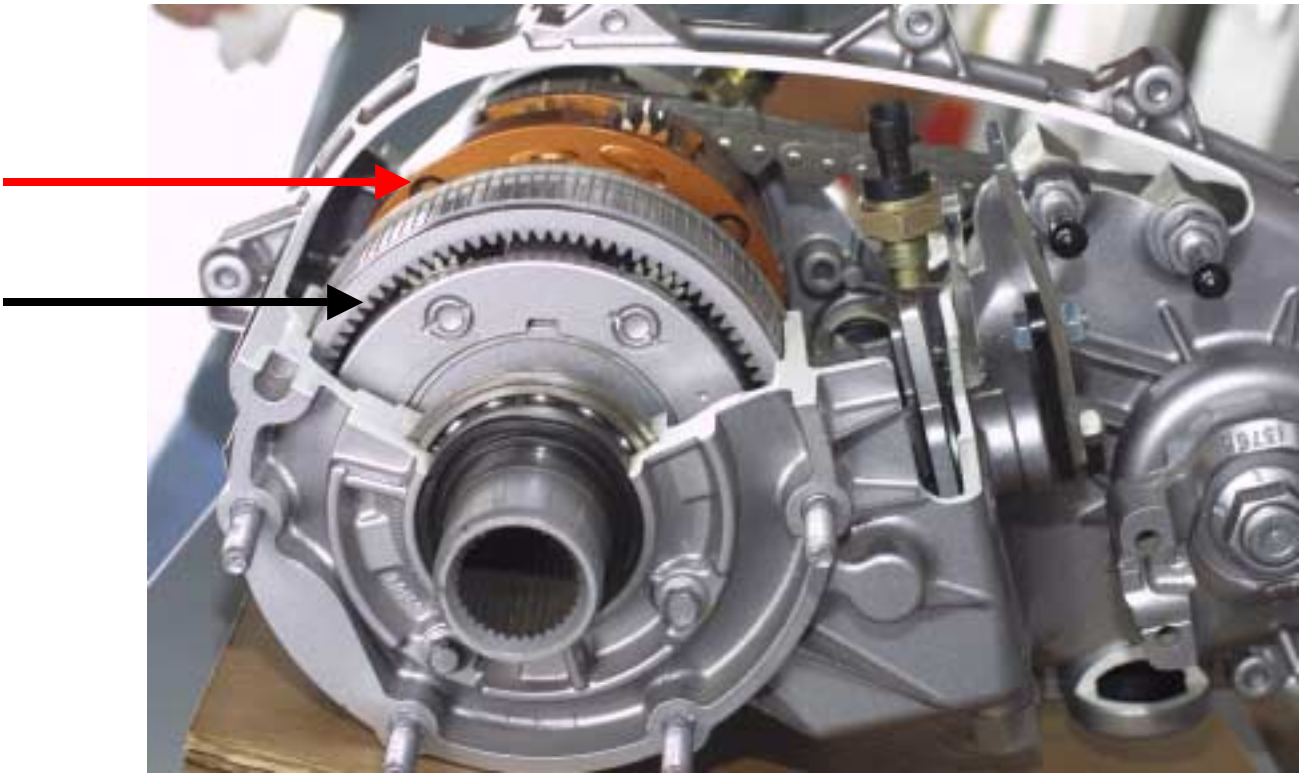
The Transfer case used in the AMG Hummer is a New Venture Gear, model 242. This case has been in use for the H-1/Hummer since the early 1990's. There have been modifications to the internal structure of the 242 over the years with the main body casting staying the same. In mid-1994, AMG strengthened and lengthened the mainshaft. This included modifying the rear housing and adding a tailpiece. The 242 is used in all engine plant configurations available in the Hummer. After 1997, AMG strengthened the pinion gears of the differential and strengthened the drive chain and main gears.

The older military trucks used a 232 model with later military trucks using a 242 case that was extensively modified for governmental requirements. The military has significant differences including mechanical and not electrical speedometer output, larger oil cooling loop, and an internal differential that is sturdier but not designed for high-speed use. The transfer case is totally enclosed with both a front and back yoke assembly.



The above picture is of a military transfer case. Notice the cooling loop travels around the "drive gear and driven gear" location in the front case. The differential has large exposed gears (right upper).

This is the civilian transfer case with the cooling loop only found in the “driven gear” half of the front case.



This is the civilian transfer case where the differential has a totally enclosed housing without gears visible. (red arrow). The black arrow identifies the planet assembly. The

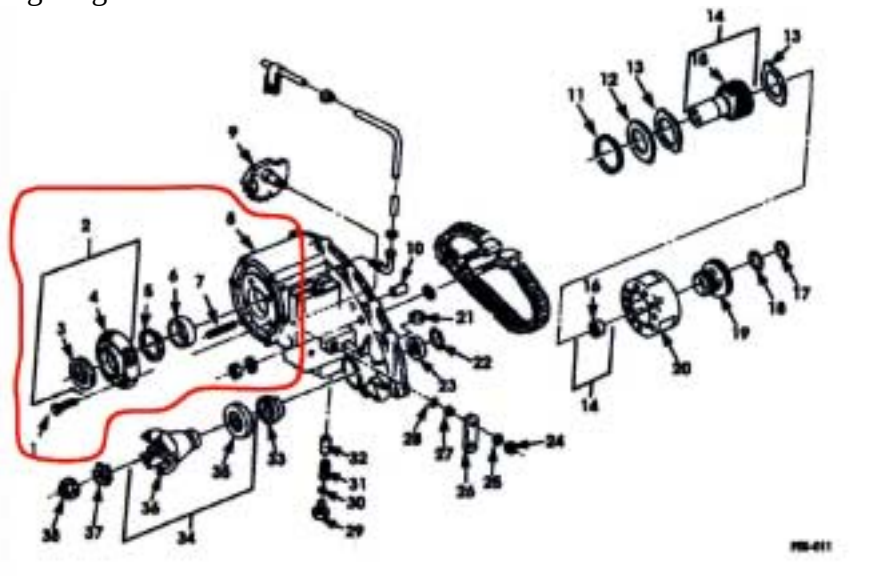
input shaft that connects to the transmission is in the 6:00 position. The front output yoke is at the 5:00 position. The transfer case range switch that rides on the shift sector plate is found at the 11:00 position. The cooling loop input and output tubes are at the 12:00 position with black caps on the ends.

TOOLS NEEDED

This will be dependant upon the level of rebuilding. If you intend to remove and replace bearings that are machine pressed, I would purchase the AMG recommended SPX/Kent-Moore tools. If you intend to only replace cooling loops, replace shifter pads, or output seals, then the tools are minimal and include a large external snap ring plier, such as the Snap-On SPR-4.

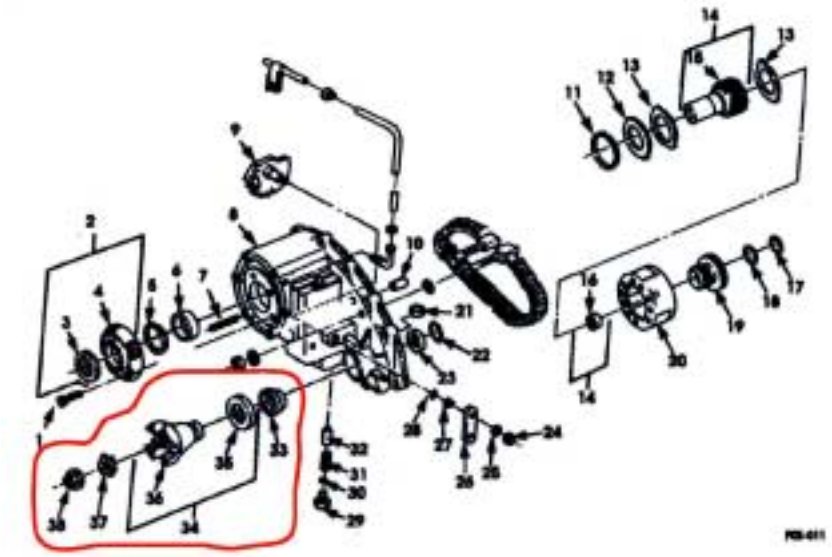
HOW TO MENTALLY APPROACH THE REBUILD PROCESS

It is easiest to think of the transfer case as to being divided up into discrete logical units. I have taken the AMG exploded parts manual diagrams and outlined the units that seem to go together.



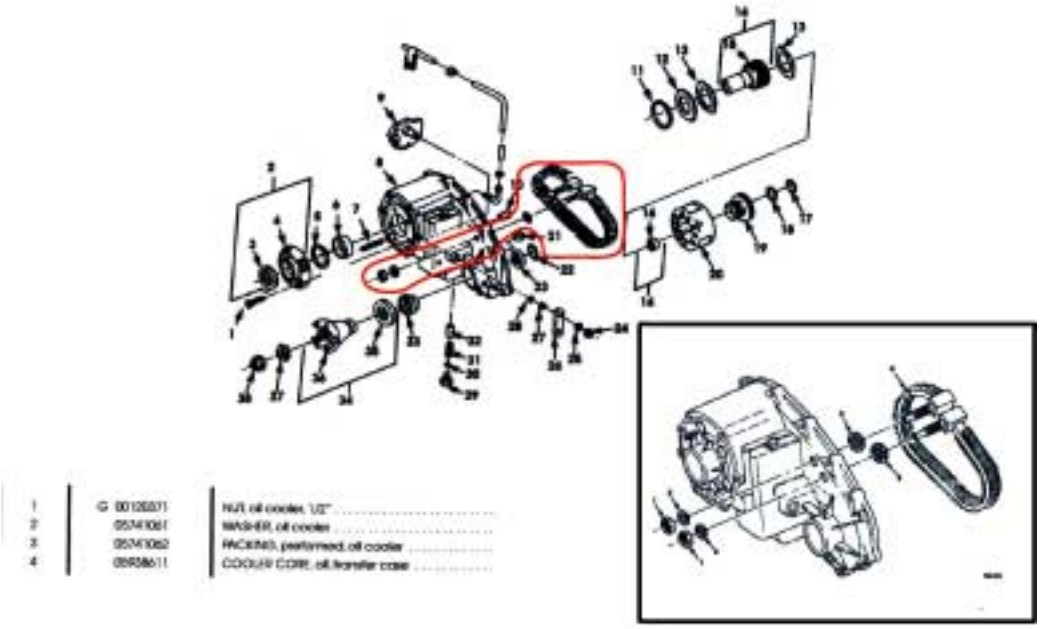
1	05938626	RETAINER SCREW, input gear
2	05938625	RETAINER ASSEMBLY, input gear
3	05740017	•OIL SEAL, input gear
4	N/S	•RETAINER, input gear
5	05938623	LOCKRING, input gear, ring, retaining
6	05714223	BEARING, transfer case
7	05740008	STUD, mounting, transfer case
8	05744429	TRANSFER CASE, front half

The Input Retainer assembly is where the transfer case physically connects to the transmission output shaft.



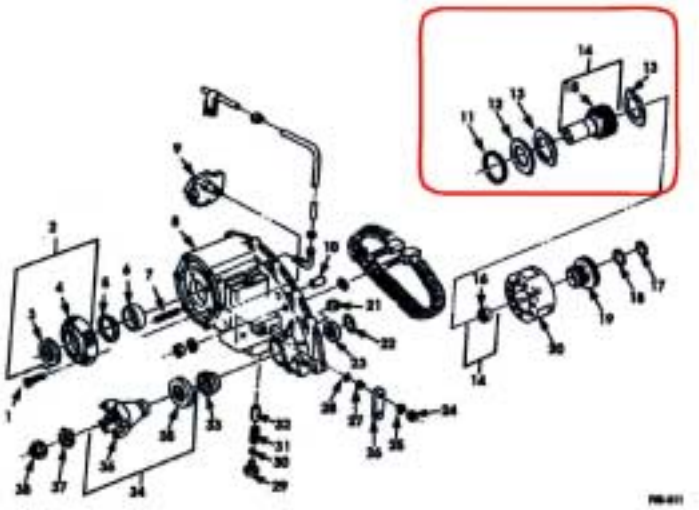
33	05714224	OIL SEAL, front output
34	05938685	YOKE AND SLINGER, front output
35	05740225	*SLINGER, front output, deflector, dirt
36	N/S	*YOKE, front output
37	05740010	WASHER, yoke and slinger
38	05740011	NUT, yoke and slinger

The front Yoke assembly connects the transfer case to the front propeller shaft.

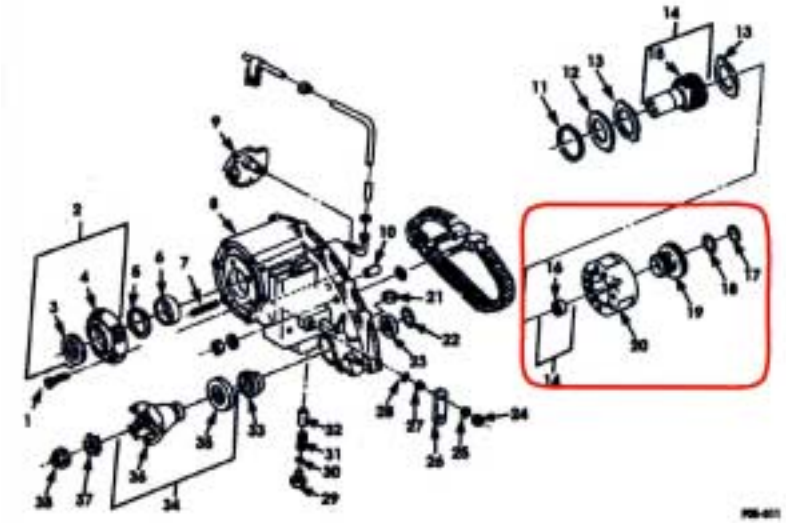


1	G 00105071	NUT, oil cooler, "G"
2	05741061	WASHER, oil cooler
3	05741062	PACKING, preformed, oil cooler
4	05938611	COOLER CORE, oil, transfer case

The cooling loop assembly is designed to have transmission fluid flow through a closed loop and fin assembly. This allows for the transferring of heat between the two separate fluid systems.

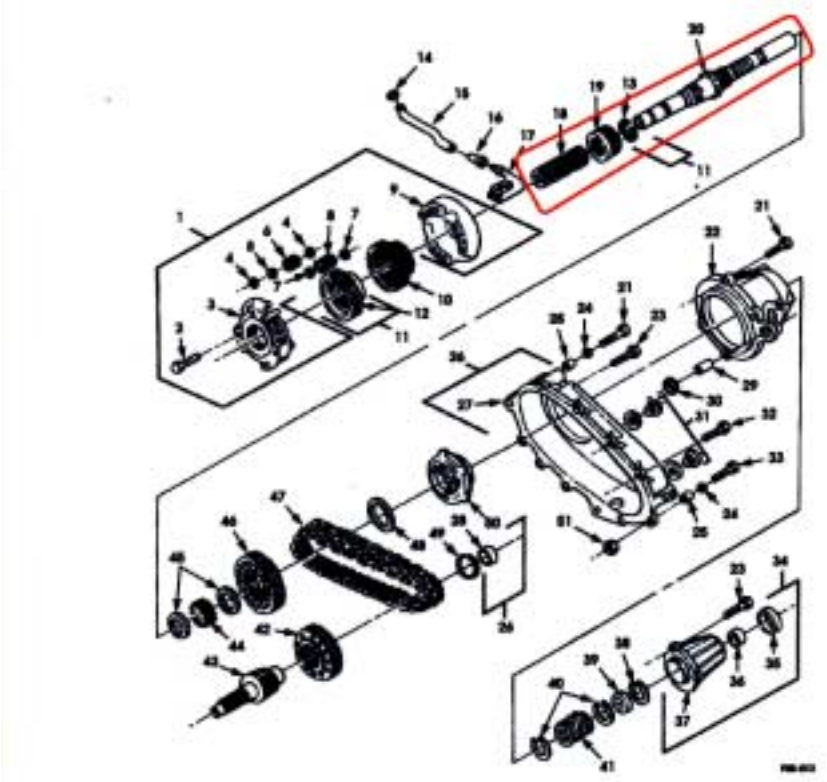


11	05938622	LOCKRING, input gear
12	05938624	RETAINING RING, input gear
13	05938619	WASHER, thrust, input gear
14	05714226	INPUT GEAR ASSEMBLY
15	N/S	•GEAR, input



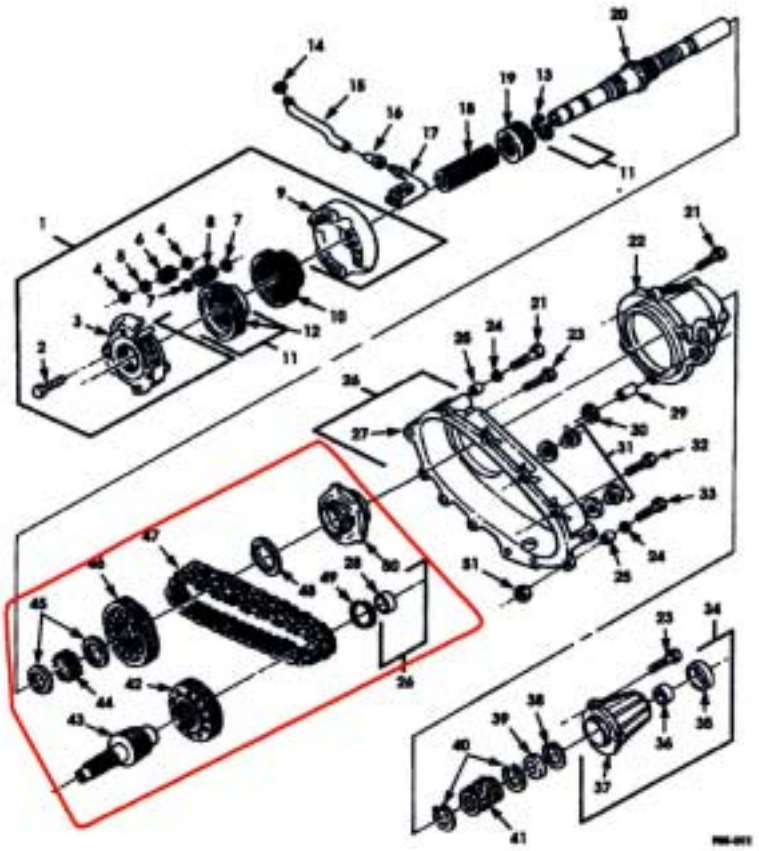
14	05714226	INPUT GEAR ASSEMBLY
15	N/S	•GEAR, input
16	05938621	•BEARING, input gear
17	05938658	WASHER, transfer case, clutch shaft
18	05938659	RETAINING RING, transfer case
19	05714229	SLEEVE, transfer case, range
20	05714225	PLANETARY ASSEMBLY

These two illustrations of the Input Gear Assembly will account for the low range locked ability of the transfer case. It includes an annulus and planet gear arrangement



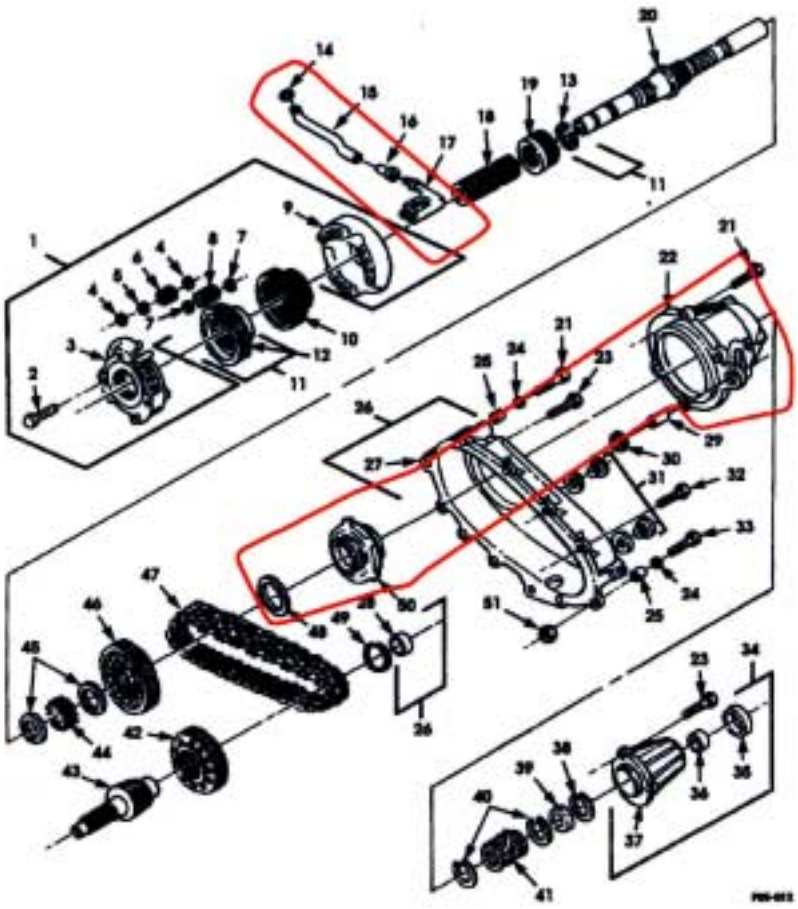
11	05938666	GEAR assembly differential
13	05938656	•RING, differential gear
18	05714228	SHAFT, intermediate clutch
19	05938660	SLEEVE, mode shift
20	05714291	MAIN SHAFT

The mainshaft assembly will ultimately connect to the rear propeller shaft that powers the rear wheel differential case. The mainshaft physically holds the differential assembly, shift selector sleeves, tone ring for electric speed sensor or worm gear for the mechanical speedometer, powers the oil pump, and etc.



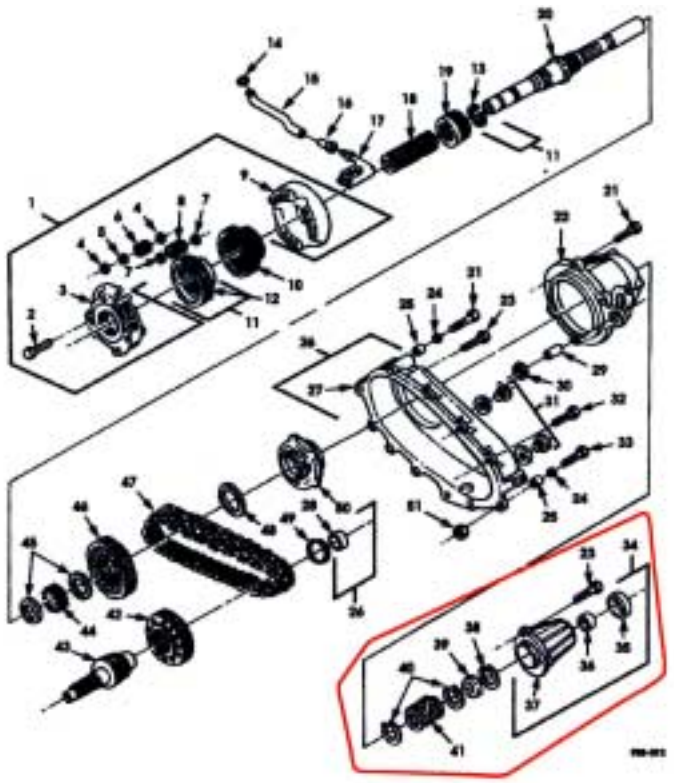
26	05742568	CASE ASSEMBLY, rear half
45	05938653	SPACER, roller
46	05938651	SPROCKET, drive
47	05938664	CHAIN, drive
48	05938652	RETAINING RING, sprocket
49	05740101	RETAINING RING, sprocket
50	05938674	PUMP ASSEMBLY, gear rotor

The chain connects the front output yolk assembly that powers the front wheel differential to the mainshaft assembly that powers the rear wheel differential.



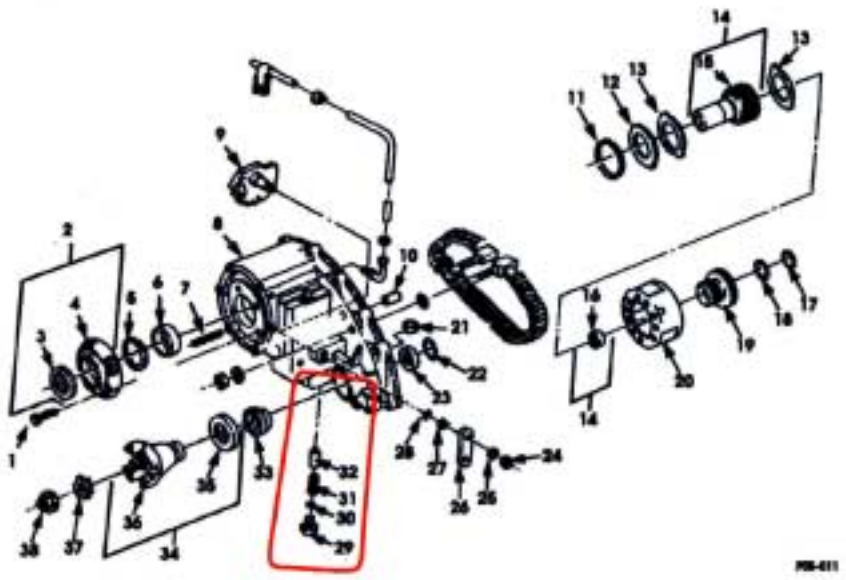
14	05938669	O-RING, oil tube
15	05938668	OIL TUBE
16	05938667	CONNECTOR, transfer case
17	05938666	SCREEN, oil tube
21	05938670	SCREW, rear bearing retainer
22	05743747	RETAINER, rear bearing
48	05938652	RETAINING RING, sprocket
50	05938674	PUMP ASSEMBLY, gear rotor

The rear housing contains the actual oil pump with the pickup tube and filter placed into the more forward transfer case half. In the newer transfer cases the tone ring for the speed sensor resides here.



40	05938673	RETAINING RING
41	05743512	TONE WHEEL
34	05714252	EXTENSION ASSEMBLY
35	05743751	•SEAL, rear output
36	05743750	•BUSHING, extension
37	N/S	•EXTENSION, rear housing
38	05938678	RETAINING RING
39	05742268	BEARING, rear output

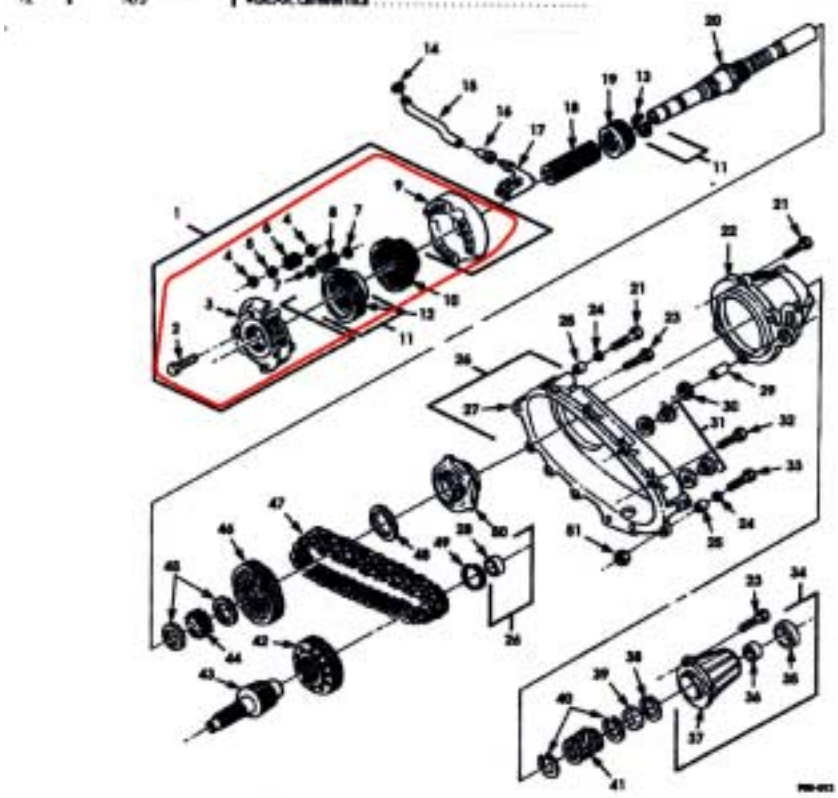
In the transfer cases with mechanical tachometer connections, the worm gears reside here. In electrical tachometer models, no gears or other components are placed in this housing.



29	05938617	SCREW, poppet spring
30	05938616	SEAL, poppet spring
31	05938615	POPPET SPRING
32	05938614	PLUNGER, transfer case

The Detent Assembly has a spring that pushes the rounded surface pin into the shifter plate. This allows for accurate positioning of the shifter forks.

1	05939260	DIFFERENTIAL CARRIER ASSEMBLY
2	05938641	•SCREW, differential carrier
3	05743072	•CARRIER, front differential
4	05938646	•WASHER, thrust
5	05938645	•NEEDLE BEARING
6	05938644	•PINION, narrow
7	05938647	•WASHER, thrust, pinion
8	05938643	•PINION, wide
9	S.I.A.	•CARRIER, rear differential (comes with item 3)
10	05938650	GEAR, sprocket carrier
11	05938656	GEAR assembly differential
12	N/S	•GEAR, differential



The differential assembly will allow for different wheel speeds when the transfer case is in the unlocked of high lock position.

DISASSEMBLY

First, I would recommend cleaning the exterior of all loose debris, mud or other material that could fall into the disassembled parts.

Second, I would remove all sensors (3) from the housing cases and plug the holes. This will prevent you from breaking the electrical connections while manipulating this 100+ pound component.

Upon removal of four bolts, the tailpiece can be removed. There is sealant holding the machined surfaces together so gentle prying is usually required. The seal can be removed with gentle tapping of the lip of the seal with a hammer and chisel.

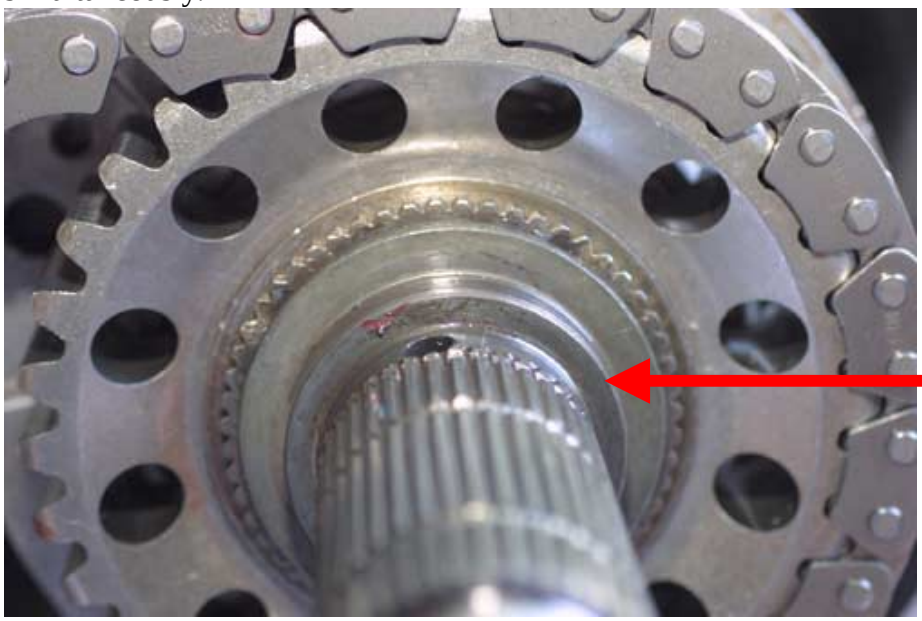
Next, remove the snap ring on the mainshaft that follows the rear housing bearing. Remove the bolts that hold the rear housing to the main case. There is sealant holding the machined surfaces together so gentle prying is usually required.

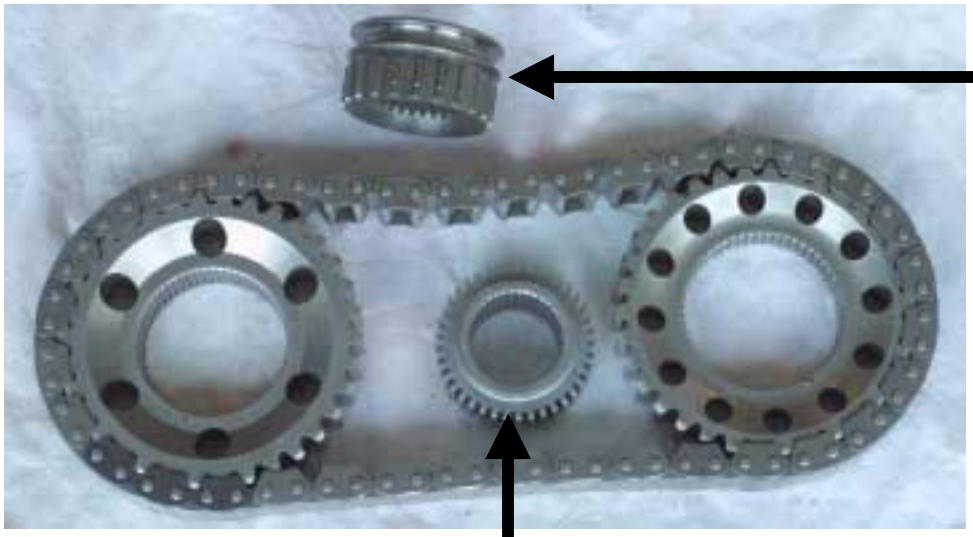
The rear bearing extends beyond the housing by 0.124 inch. This is proper seating of this bearing.

Next, remove the snap rings on either side of the tone ring used by the speed sensor. The speed sensor will detect the peaks and troughs of this gear and issue signals (Hall effect).

Remove the bolts, plate and the 12-point-head bolts that hold the two halves of the main case. Note: The two 12-point-head bolts may have nuts on them (used to hold an exhaust bracket). There is a groove on either side of the case that allows for a large screwdriver to be placed for prying the sealed surfaces away. While holding the oil cooler separate the two halves of the main case.

Remove the large snap rings on both of the large gears. Pick up the chain and both gears at the same time as a unit and slide off the mainshaft and front output shaft assembly simultaneously.

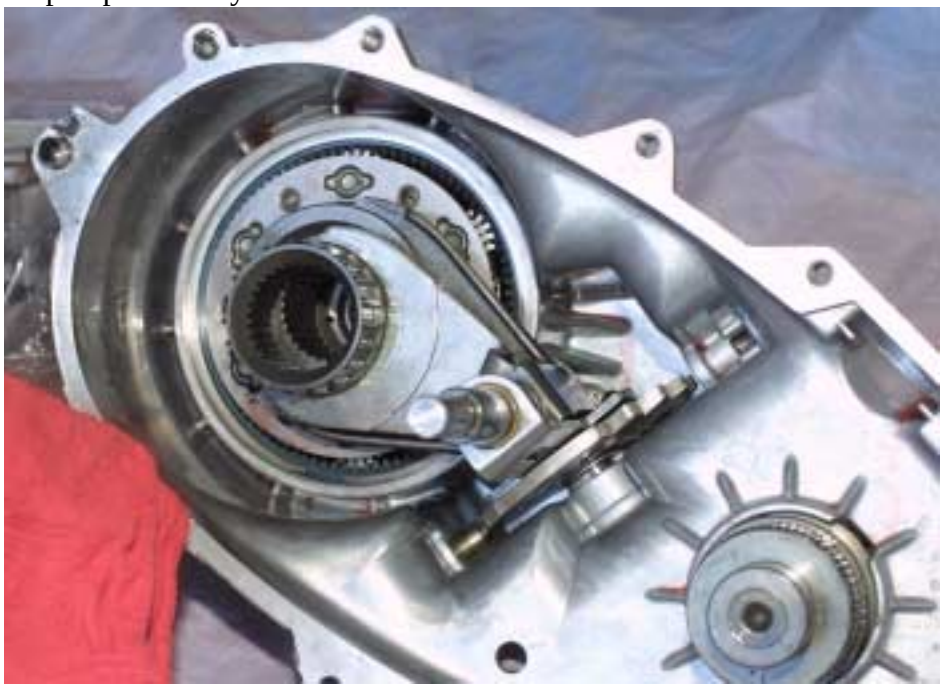




Mode sleeve

Speed sensor tone ring

Next, the mainshaft can be removed from the input and shifter gear assembly by pulling the unit straight out. The mainshaft will have on it, the intermediate shaft and differential assembly. The front half of the main case will have the input assembly, cooler loop, front output shaft assembly, and shifter assembly. The rear half of the main case will have the oil pump assembly.



On the left is the input assembly with mode sleeve in place. To its immediate right is the shifter assembly. To the far right is the front output shaft assembly. The cooling loop has been removed. The slot at the 2:00 to 3:00 position holds a magnet. Immediately below, is the oil pump intake filter. (Removed)

Starting with the mainshaft, remove the snap ring prior to the intermediate clutch shaft. This allows the shaft to be removed with its thrust washer.

Remove the snap ring immediately prior to the differential assembly. The assembly can be removed from the mainshaft. Note: perform this is a clean flat work area for individual bearings will fall out upon separating the two components.

This shows the bearings in place on the mainshaft. During assembly they are held in place by petroleum jelly.

There is a spacer ring that is placed on top of the loose bearings.

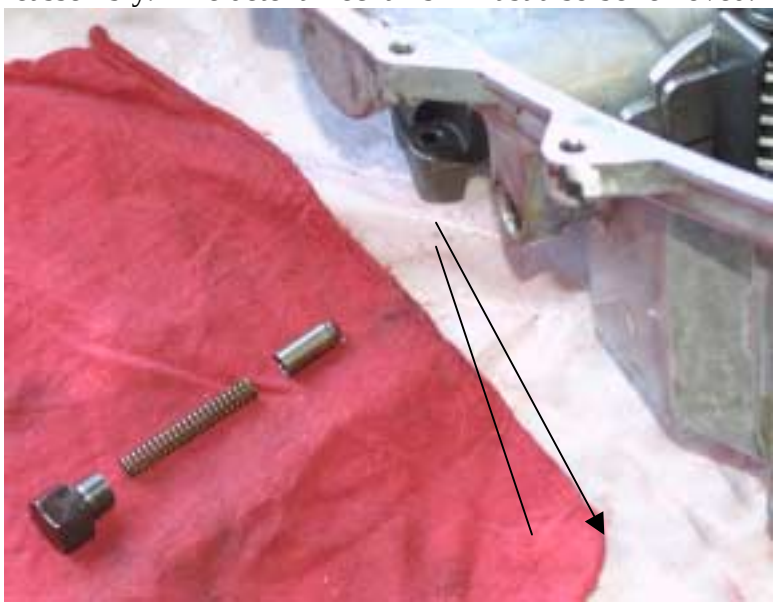
The differential case can now slide off of the mainshaft. The differential case can be opened to inspect or replace the pinion gears or bearings. There are 16 loose roller bearings for each of the three short pinion gears. There are three slots in the housing to allow prying the plates after the 12 point bolts are removed.

Thruster washers are placed on the bottom and the top of each long and short pinion gear. The short gears (7:00 position) have 16 individual bearings between the gear and the post of the differential case.

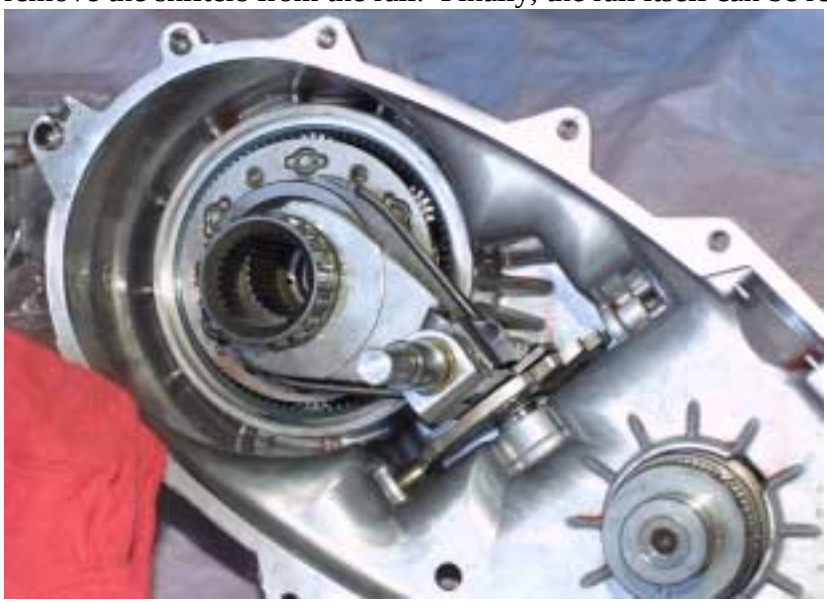
When replacing the gears, it is essential that all bearings are present in each wheel. I used grease to hold the bearings in place and placed the bearings in the gear first then I inserted the gears into the carrier plate.

The cooling loop is removed by removing the two nuts on the in flow and out flow tubes with the respective washers. If the cooling loop is to be reused, the square ends must be held during removal of the nuts to prevent damage to the loop.

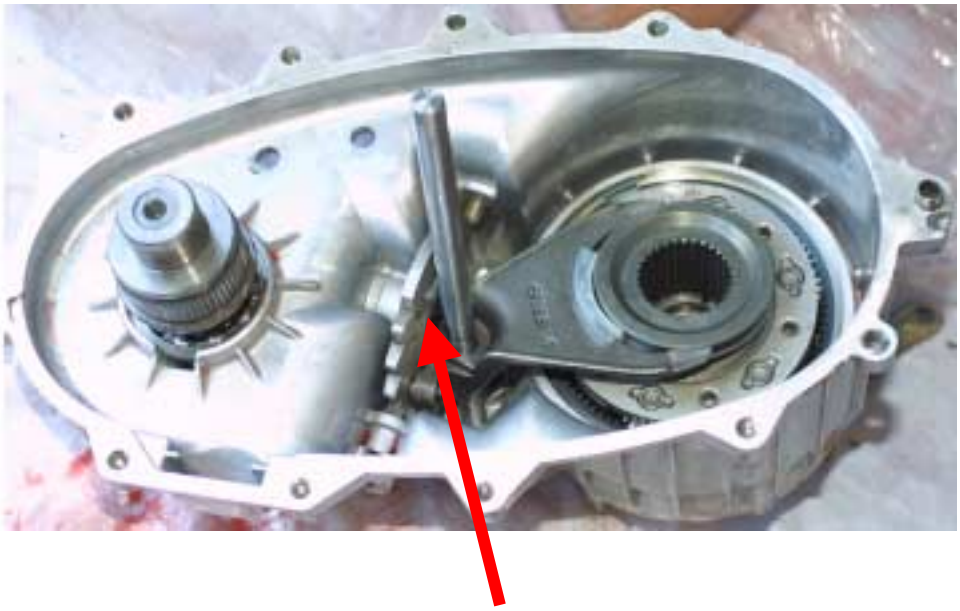
To remove the shifter mechanism, a roll pin must be removed from one of the forks (access hole covered with a black rubber plug). Later model transfer cases do not have this roll pin or the rubber plug. The roll pin is not required and may be left out during reassembly. The detent mechanism must also be removed.



Next remove both of the shifter mode gears and the corresponding plastic pads from the shifter arms. By moving the operating lever both forward and backward, it is possible to remove the shifters from the rail. Finally, the rail itself can be removed.



This shows both shifter arms (mode and range) with the corresponding sleeves in place on the shifter rail. The shifter arms slide down onto the rail and have a pin that inserts into slots on the sector plate.



The upper slot in the sector plate for the mode arm pin is just visible. To remove the arms, you must manipulate the operating lever while twisting the arm to dislodge the pin. Once unengaged, the arm can slide away from the rail.

Each shifter fork has three plastic pads. The arrow identifies the pin

At this time, only the input gear assembly with the planetary gear assembly remains in the front case halves.

The outer annulus and inner assembly with the planet gears are now exposed, once the shifter mechanism is removed.

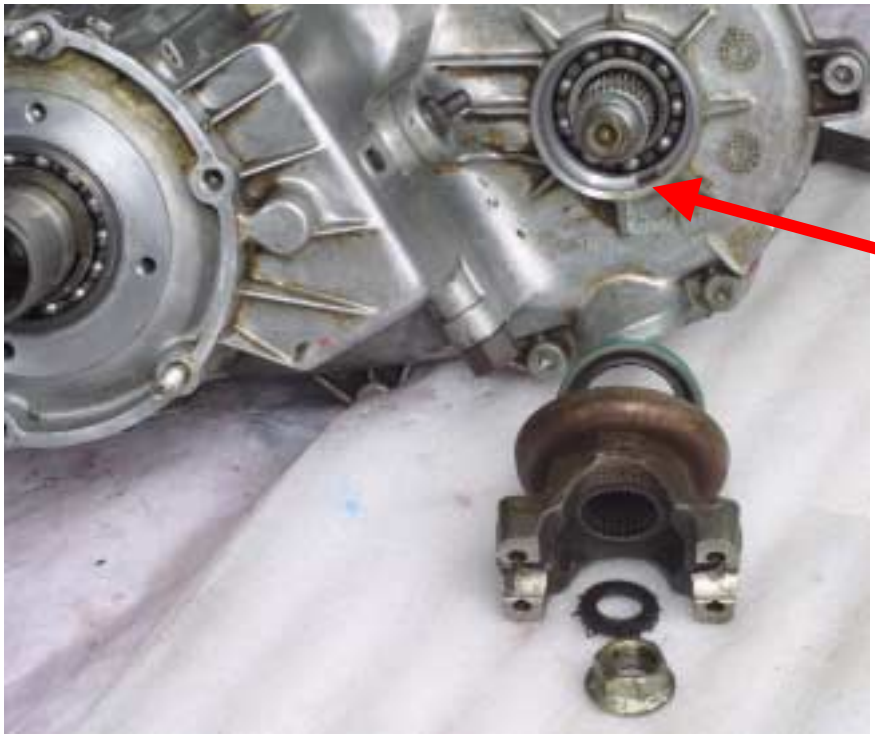
Four bolts remove the input gear retainer. This exposes the input transfer case bearing which has a snap ring prior to it. An oil seal is present in the retainer.

With the planetary assembly in the back portion of the front transfer case halve, the input gear retainer is attached to the forward portion of this case.

By removing a snap ring, the input gear and planetary assembly can be removed from the case. Several snap rings will hold this unit together.

I have not disassembled the planetary assembly so I refer you to the AMG manual for further description.

The Front output yoke is removed by using an impact wrench to remove the yolk nut. A soft rubber washer should be gently removed so as not to tear it. The yolk can be pulled out of the front output splined shaft. There is a front output bearing held with a snap ring.



Notice the snap ring prior to the bearing.

REASSEMBLY

Torque specifications:

- Case bolts – all 20-25 lb-ft
- Detent plug 12-18 lb-ft
- Drain and Fill Plugs 30-40 lb-ft
- Exhaust Bracket Nuts 18-22 lb-ft
- Extension Housing Bolts 20-25 lb-ft
- Front Retainer Bolts 12-18 lb-ft
- Front Output Shaft Yoke Nut 130-200 lb-ft
- Indicator switches, Both 15-25 lb-ft
- Oil Cooler Nuts 150-230 **Inch Pounds**
- Range Lever Nut 20-25 lb-ft
- Rear Retainer Bolts 22-25 lb-ft
- Speed Sensor 30-35 lb-ft
- Transfer Case Mounting Nuts 20-26 lb-ft

Sealer for Machined Surfaces

- Loctite 518
- Or Permatex Ultra Black
- Or Permatex Ultra Copper
- Applied to transfer case halves, rear case and tailpiece
- Apply a 3/16 inch or 5 mm bead, then evenly distribute over surface

- Do not allow much of this liquid gasket to enter actual case and contaminate fluids
- Lubricate gears and other component surfaces with Dextron III using a spray pump bottle

Snap Rings

- Replace any distorted or bent rings that are out of true round
- Measuring the diameter of the snap ring in 2 different planes will determine out of round

Installing of Bearings

- Since the cases are aluminum, much care is needed when installing bearings. The bearing must be placed into the case in a totally flat orientation or the case can crack. These must be properly seated or various components will not fit. Snap rings not having ample room to fit into the associated machined slots usually detect this condition.
- The use of AMG recommended tools (pricey) for each specific bearing or bushing is recommended or submitting the case and bearings to a machine shop with hydraulic press might be more cost effective. I used an experienced machine shop.