



# Borg-Warner's 4472 All-Wheel-Drive Transfer Case

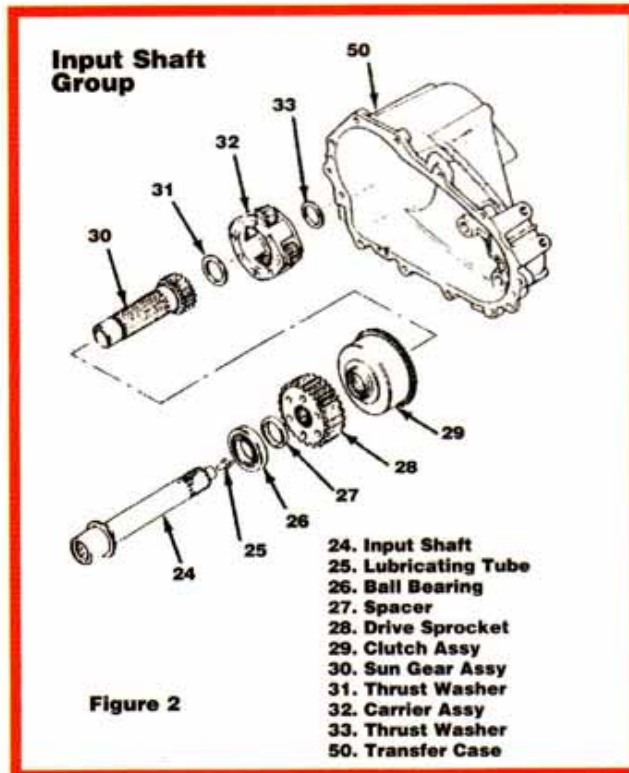
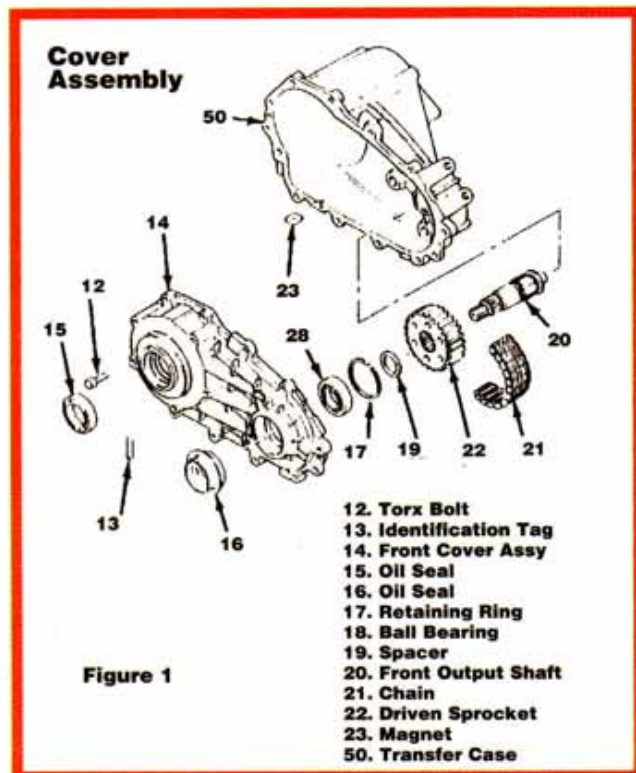
By Mike Weinberg  
Contributing Editor

For the past decade America has had a love affair with sport/utility vehicles. In the ferocious battle for market share, every car maker has brought out sport/utility vehicles and other varieties of all-wheel-drive and four-wheel-drive models. The promise of safety in all weather conditions and making a passenger vehicle more versatile obviously has appealed to the consumer, with the huge numbers of the cars and trucks on the road.

Many vehicles sold today are all-wheel-drive as opposed to four-wheel-drive. The distinction between the two is driver control. All-wheel drive is

defined as ALL-time four-wheel drive with power being provided to both axles at all times and no provision for the driver to control the system. If the driver has the control to shift from two-wheel drive to four-wheel drive, this is considered to be four-wheel drive.

General Motors has answered its competition by producing an all-wheel-drive minivan using a Borg-Warner 4472 all-wheel-drive transfer case. This unit will be found in the Astro, Bravada, Safari and Typhoon models. The 4472 is a chain-driven unit using a 3-piece aluminum case. This unit uses a viscous coupling to distribute torque between the front and rear axles. Torque is divided 33% to the front and 66% to the rear for better drivability.

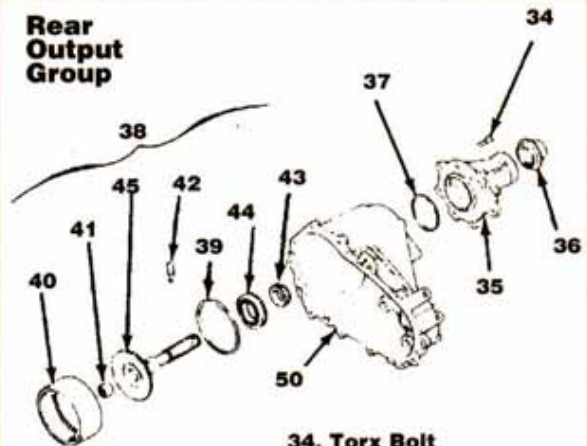


## POWERFLOW

Torque passes through the input shaft to the planetary and through the annulus gear (ring gear) to the rear output shaft. Power passes through the planetary to the sun gear, which is connected to the drive sprocket. This in turn drives the driven sprocket through the chain and puts power to the front output shaft. The ring gear is connected to the sun gear through the viscous coupling. The bias or split is 33/66 front to rear to ensure smooth turns with a minimum of wheel hop and vibration.

The viscous coupling is a sealed, self-contained unit that cannot be rebuilt. Inside the viscous coupling are a set of steel discs that are splined alternately to the front and rear output shafts much like clutch plates and steels in an automatic transmission. The plates are immersed in a high-viscosity silicone fluid that is temperature sensitive. As the plates shear through the fluid, resistance increases and the fluid expands, and power is transmitted from plate to plate. Because the silicone fluid is not available to us in small quantities and you need very expensive precision measuring equipment to fill the coupling, don't open one up. We have been working with viscous couplings since the arrival of the NP229 transfer case. If you observe a viscous coupling that is discolored or leaking fluid, replace it. None of the manuals gives

### Rear Output Group



- 34. Torx Bolt
- 35. Extension Assy
- 36. Oil Seal
- 37. Retaining Ring
- 38. Output Assy
- 39. Retaining Ring
- 40. Ring Gear
- 41. Needle Bearing
- 42. Oil Scoop
- 43. Speedo Rotor
- 44. Ball Bearing
- 45. Rear Output Shaft
- 50. Transfer Case

Figure 3

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### Jeep Transfer Cases



- 231J Command Trac
- 242J Select Trac
- 247J Pump Coupler AWD
- 249 J AWD

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