# ALL WHEEL DRIVE vs. FOUR WHEEL DRIVE

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We find that many of our customers want to know what the difference is between All-Wheel-Drive and Four-Wheel-Drive? I remember asking that same question when All-Wheel-Drive systems first came on the market. Let's see if I can explain as simply as possible.

Now, remember, as a Ford and Lincoln dealer, I am most familiar with Ford systems. However, most drive systems out there operate pretty much the same as those used by Ford or Lincoln.

A typical four-wheel-drive vehicle has a normal engine that connects to either a manual or automatic transmission. The transmission is then attached to what is called a transfer case. The transfer case has an internal mechanism that allows it to turn two attached drive shafts – one that goes under the engine to the front axle assembly and the other that goes directly to the rear axle assembly. The transfer case can be shifted – either with a manual lever or electronically by a dashboard switch – so that it transfers torque to just the rear drive shaft (2-wheel-drive) or so that it transfers torque to both the rear and the front shafts at the same time (four-wheel-drive). Both drive shafts connect to individual differential gear sets that turn the axles that turn the wheels that move the vehicle down the road. The driver decides when he or she wants either two-wheel-drive or four-wheel-drive and engages the assembly accordingly by either throwing a lever or flipping a switch. Four-wheel-drive vehicles should be driven in two- wheel-drive mode when operating on dry pavement.

All-wheel-drive (AWD) in Ford vehicles is used only in cars, trucks or SUVs that normally offer front wheel drive. The transmission - in this case called a transaxle - is attached directly to the engine. The drive axles to the front wheels are attached directly to the transaxle. Then, there is an electromagnetically activated clutch pack called a power transfer unit that attaches between the transmission and the rear drive axle.

Under normal driving conditions, AWD operates a lot like a front-wheel-drive vehicle with much of the power sent to the front wheels. However, the AWD system continuously monitors throttle position, steering angle and wheel speed to determine the vehicle conditions and the driver's intent. The system then seamlessly determines the optimal amount of front and rear torque to apply for the given conditions to reduce wheel-slip and even to prevent slip from occurring in the first place. In order to activate the rear wheels, the computerized AWD system electronically activates an electromagnet in the clutch pack to push the clutch plates together and drive the rear wheels. It does so when sensors detect wheel slip in the front wheels, or, as said earlier, will act preemptively to prevent slip from happening in the first place. The system reacts within milliseconds to distribute up to 100 percent of the available torque to the rear wheels. Simply put, the system directs power to the appropriate wheels with the best traction.

So, from my standpoint, for the average driver, a modern AWD system has great advantages over a four-wheel-drive system. Its ability to proactively react to and compensate for different driving situations and thereby maintain control in adverse conditions takes the guess work out of the equation. The driver can have greater confidence in all climates and on various road conditions. If you haven't had the opportunity to drive an AWD equipped vehicle, you are in for a pleasant surprise. It is the ultimate all-season system for our Interior Alaska roads.

***Ralph Seekins has more than 42 years' experience in the automotive industry. He started as a mechanic, worked in sales, and for the past 36 years, has been the owner of Seekins Ford Lincoln.***

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