

HOW TO DRIVE YOUR PART-TIME 4X4 VEHICLE

Around one third of the new 4x4s sold come with part-time 4x4 drivelines and our bet is that 99 percent of them will be improperly operated. The part-time driveline is poorly understood by 4x4 owners and 4x4 sales people.

Driving any Japanese 4x4 ute (except a top-spec, post-2009 Triton), a Troopy, a base-model LandCruiser wagon, a Patrol, a Suzuki, a Jeep Wrangler or old-shape Cherokee, a Challenger, a Jackaroo, a Frontera, a Terracan, a Sorrento, a Musso or a Rexton? Or one of the older Japanese 4x4 wagons in the market? You'd better understand how a part-time 4x4 system works, or you could be in for expensive transmission repairs – just through driving it incorrectly.



Despite many articles on the different types of 4x4 systems the traditional and most common part-time 4x4 driveline is still little understood, while accidental abuse of the part-time driveline continues to break components. For example, typical damage in Jeeps is broken front diffs and in Toyotas it's transmission bits.

Part-time 4x4 drivelines have no central differential or wet clutch pack, which means that the front and rear propeller shafts must turn at the same speed when 4x4 is engaged.

Driving a part-time 4x4 vehicle on high-friction surfaces in 4x4 mode causes transmission damage and tyre wear, because the driveline has no mechanical way of providing the necessary differential action between the front and rear axles. The only 'out' for the torque build up is in wheel slip and that can't happen if there's too much tyre grip.

When operating a part-time 4x4, the machine should be driven on high-grip surfaces in 4x2 and then put into 4x4 mode when conditions warrant it, such as when a bush track becomes steep and loose or slippery. Even more importantly, the driveline should be put back to 4x2 mode when the track is no longer steep, loose or slippery.

It's also vital for transmission life that the vehicle be in 4x2 mode when turning tightly on surfaces that don't need 4x4 for traction.

Even with power steering you can feel the extra loading in the steering when you're using 4x4 unnecessarily. That load is 'wind up' torque in the gear train and it can break things.

Although part-time 4x4s dominate working vehicle numbers there's very little training given to their operators in the correct use of the part-time system – the most glaring omission being careful instruction on when to use 4x4 and when to disengage it.

There is also great confusion about the function of free-wheeling hubs. A manual or automatic free-wheeling hub contains a spring-loaded sliding collar, which couples and uncouples the front axle shaft to the front hub.

By isolating the front drive assembly using free-wheeling hubs, 4x4 makers save some fuel consumption, vibration and noise, but the main reason it's done is to prevent premature wear in the front differential, which is designed to 'drive' the front wheels, not to be 'driven' by them.

Some owners fear they'll 'wind up' their driveline and increase tyre wear if they drive on high-friction surfaces with the hubs locked while in 4x2 mode - they won't.

Locking the hubs doesn't engage 4x4: it just readies the front axle for 4x4 engagement in the transfer case.

Once the hubs are in 'lock' mode and with the vehicle running straight ahead, four-wheel-drive can be selected via the transfer case lever or dashboard switch, without stopping the vehicle, because the front and rear propeller shafts are turning at synchronous speed.

Automatic free-wheeling hubs are a popular way for 4x4 makers to get around the inconvenience and misunderstanding of manual hubs. Auto hubs function in much the same way as manual hubs, but are locked by stopping the vehicle and selecting 4x4.

Thereafter, the hubs remain locked, even if the transfer case lever is moved back into the 4x2 position. They're unlocked by reversing for a few metres and so they're unreliable in 'vehicle rocking' manoeuvres, where you're trying to extricate the machine from a hollow by building up forward and backward momentum. Auto hubs are likely to disengage in these circumstances, which is why Nissan put a manual override on its Patrol automatic front hubs.



'Shift on the fly' 4x4 engagement is a further refinement of the auto hub principle in which 4x4 can be selected without the need to stop the vehicle for initial selection. However, the basic driveline of these systems is still part-time, so they can't be operated on high-friction surfaces in 4x4 mode without the risk of transmission damage.