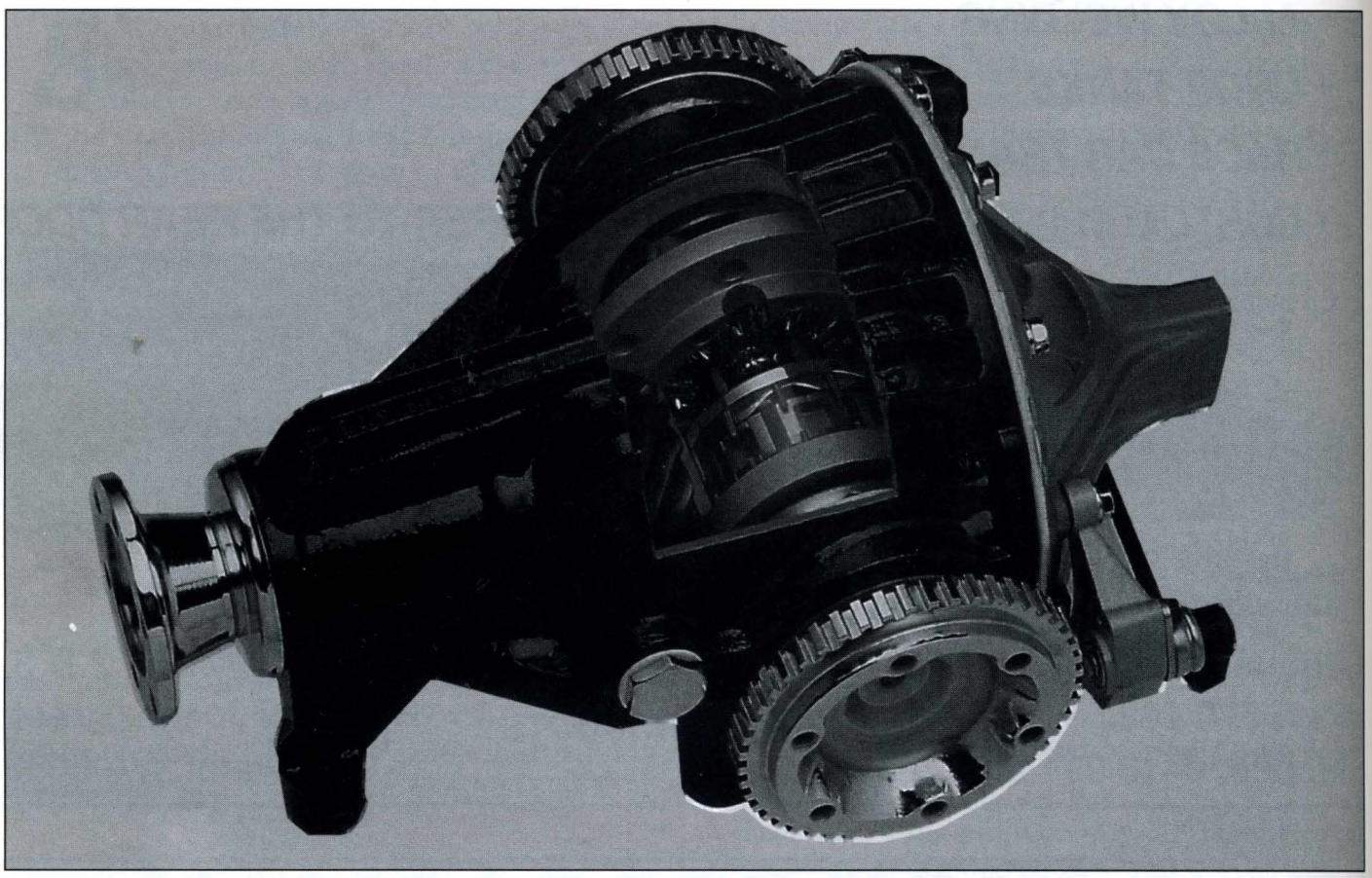
Hydratrak – How it works



Most of you will have read the articles we run from time to time on new differential innovations. Perth Street Car magazine was recently approached by the WA Diff Centre in O'Connor to take a behind the scenes look at the new BTR Hydratrak - the what? Well, if you are into earlier model vehicles and tough 9 inch diffs then we will pardon this question. If, however, you get more into late model cars, particularly Commodores, then you should know about this ingenious Australian invention.

Since time immemorial, man has been attempting to create the perfect compromise between a full spool and an open centre. One provides excellent traction but kills tyres during regular driving and the other provides excellent driving manners but kills egos on the burnout pad. An eternal dilemma. Most of us do just fine with our Detroit Lockers, Lock Rites and LSDs - they have served well over many years but progress is always in the wings and the boys from BTR have a new product on centre stage.

Hydratrak is the nineties' version of "mechanical traction control", no longer are they

Hydratrak carrier assembly replaces factory unit.

Four pinion gears are used to reduce stress and increase power capacities.

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content with "limited slip", now they can "maximise torque distribution". Modern cars are slowly being weened of their rough idiosyncrasies and in the age of legal factory strokers a killer factory diff combo was inevitable.

Hydratrak is described as a speed-sensitive traction control device. Put simply, it smoothly transfers torque from the fast-spinning wheel to the slow-moving wheel. Because this is done hydraulically and not mechanically the effect is very smooth and (as the name suggests) the greater the relative difference in wheel speed, the greater the transfer of torque.

The new diff is fitted as standard equipment on all performance HSV vehicles and in all Ford "Outback" Longreach utes. It can now be retro-fitted to all EB and later Falcons and all VN and later Commodores. The Hydratrak comes in a kit and due to the unique nature of the special centre, requires that both axles be replaced. As can be seen from the photographs, the crux of the issue is the fully-sealed Coupling Unit. The right axle slots into the right (outer) side of the coupling which also has the right-hand-side side gear welded to it. The left axle slots inside the smaller splined hole on the left (inner) side of the coupling and uses the car's original side gear.

When the car is travelling in a straight line nothing happens as there is no relative speed difference between the two axles (as they are turning at the same speed). However, when the vehicle corners one axle begins to travel faster than the other and a speed difference occurs. This is when the Coupling unit does its stuff. Inside, a series of vanes begin to move back and forth as they following the cam profiles on each side of the coupling. This movement in the vanes causes the hydraulic fluid to be pumped into small chambers which creates hydraulic friction and creates torque transfer. The principle can be loosely related to the operation of a torque converter in an automatic transmission. As the left axle is connected to the inner hub of the coupling and the right axle is connected to the

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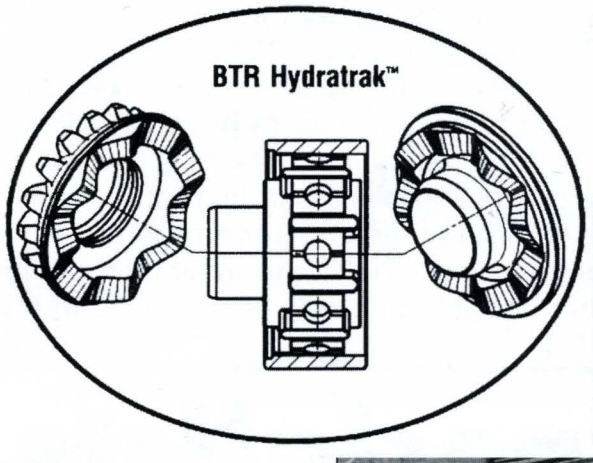
Left side of coupling unit accepts specially splined axle.

Right side of coupling unit has new side gear welded to it.



Axles must be replaced – now you can see why left-hand axle has special spline extension which fits into coupling unit.

outer case of the coupling the only physical contact between the two is via the hydraulic fluid.

As one wheel spins faster and faster the greater the torque transferred to the other wheel. This smooth transfer of torque gives the impression that the car is equipped with an elaborate electronic traction control unit. HSV skid-pan tests have shown this to be true in real life as well as in theory. Even the highly sceptical motoring media have given it the thumbs-up.

Hydratrak really is the perfect non-electronic compromise between a locker and a one-legger. It senses wheel speed and therefore will not cause tyre scrub or chirping during slow cornering but it will prevent one wheel spinning uselessly in a demanding situation - what more could you ask for. If you have any further queries or are looking to upgrade your late-model Falcon or Commodore then give Richard a call. The Hydratrak is worth some serious consideration.