

Zeroshift could overtake synchromesh gears

A COMPANY in Milton Keynes has devised a new way to change gears that could challenge the ubiquitous synchromesh. Bill Martin, managing director of Zeroshift, says his technology is cheaper, saves fuel and reduces emissions.

Zeroshift technology is a seamless, instantaneous means of changing gear ratios without interrupting the torque to the driveline. Martin says it is cheaper than both continuously variable transmissions (CVT) and double-clutch transmissions (DCT).

And because of its enhanced performance, it allows manufacturers to downsize powertrains – allowing, for example, a 1.2-litre engine the same

performance as a 1.4-litre engine – by eliminating the shift time of a synchromesh manual gearbox.

Zeroshift is in talks about exclusive licence agreements with global automakers and Tier 1 component suppliers to apply the transmission across all segments, from luxury and sports cars to small hatchback saloons.

“With each of the other gearbox technologies there are segments where some transmissions are better suited than others. But this is not so with Zeroshift – it is ideal for all,” says Martin.

Zeroshift can replace the conventional synchromesh unit in a manual gearbox or in an automated manual transmission (AMT). With an upper torque limit of

5,000Nm, the design can also be used in off-road, light and heavy commercial vehicles, buses and coaches, tractors, forklift trucks, military vehicles, motorcycles and even motor racing.

It could also be applied to both hybrid and electric cars.

Zeroshift technology uses a series of unidirectional dogs or bullets, which operate automatically for up- and downshifting under hydraulic or pneumatic pressure. These replace the conventional synchromesh unit to create an AMT, with the appropriate control system. The unidirectional nature of the engagement (two sets, one for each direction) means that during a shift the system is engaged in two ratios at the same

time, albeit in the same torque direction.

First generation AMTs were introduced in small, high-volume cars in 2000 but have not been very successful because of torque interrupt and poor shift quality. Based on a manual transmission, but with an automated clutch and shift operation, the AMT can use an existing manual transmission and so can be built in existing plants. CVTs and DCTs require bespoke manufacturing facilities.

On a typical city driving cycle, the Zeroshift AMT is expected to return a 5% improvement in fuel economy over a manual.

Up a gear: Zeroshift uses a series of unidirectional dogs or bullets



