SUMMARY CHARACTERISTICS

Modularity and **large ratio range** (=9) are the most important characteristics of Warko, the new CVT (Continuously Variable Transmission) presented during the **6th International CTI Symposium of** Innovative Automotive Transmission**,** in Berlin, 3-7 December 2007.

Adding **high efficiency** (95%), **high torque capability** (up to 500Nm), **compactness** (lenght: less than 36 cm; diameter: 31 cm; weight: 60 kg) and **absence of clutch**, Warko has the right numbers to become, in the near future, a must in Automotive.

Modularity

The same identical cone, with different assembly levels, covers the 90% of all engines produced in the world , with a power range that goes from 60 to 200 Hp and more, gasoline and diesel.

The figure shows two production lines, always using the same cone. The difference between the lines, is the employment of two different couples of hub and ring.

Of course, changing the hub, the ratio between cone diameters and hub diameters will change too.

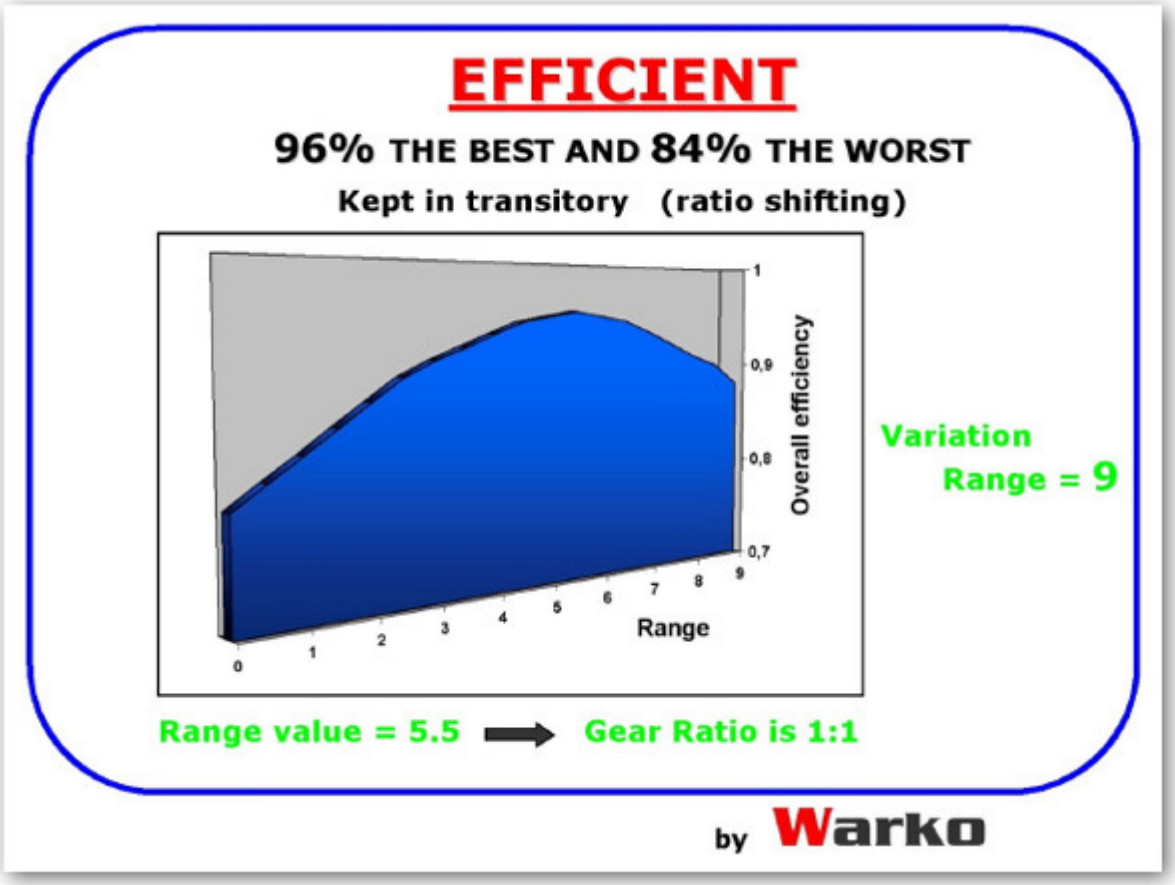
Considering the big hub (upper line - big torques), the **ratio range is 8**. Considering the small hub (lower line), the ratio range is **more than 10**.

Large range of variation

More than any other CVT, Warko has a wide range of variation, which is equal to 9. This means having a better acceleration, and further speeds beyond the correspondant mechanical.
At 130 Km/h in highway, the engine revolutions changes from 3000 rpm/h (final mechanical speed) to 1800 rpm/h (Warko final ratio).

Efficiency

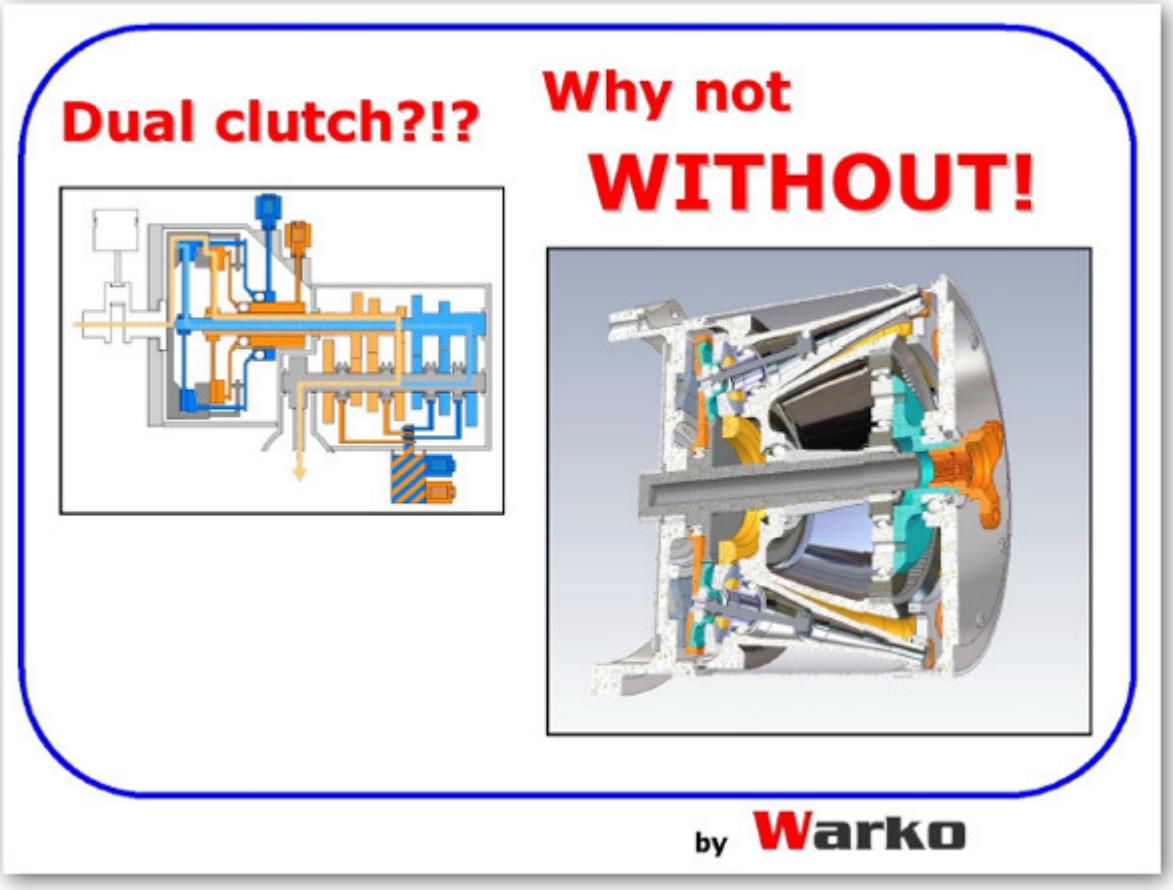
Warko reaches a very high mechanical efficiency, the best being 96% and the worst being 84%. These values are kept in transitory, this means that, even during the variation of transmission ratio, there is no lack of performace.



No clutch

The engine is always connected to the wheels; the rear drive is realised employing an epicycloidal system in output, called *power split*, which allows the condition of *geared neutral*, or *zero Dynamic*:

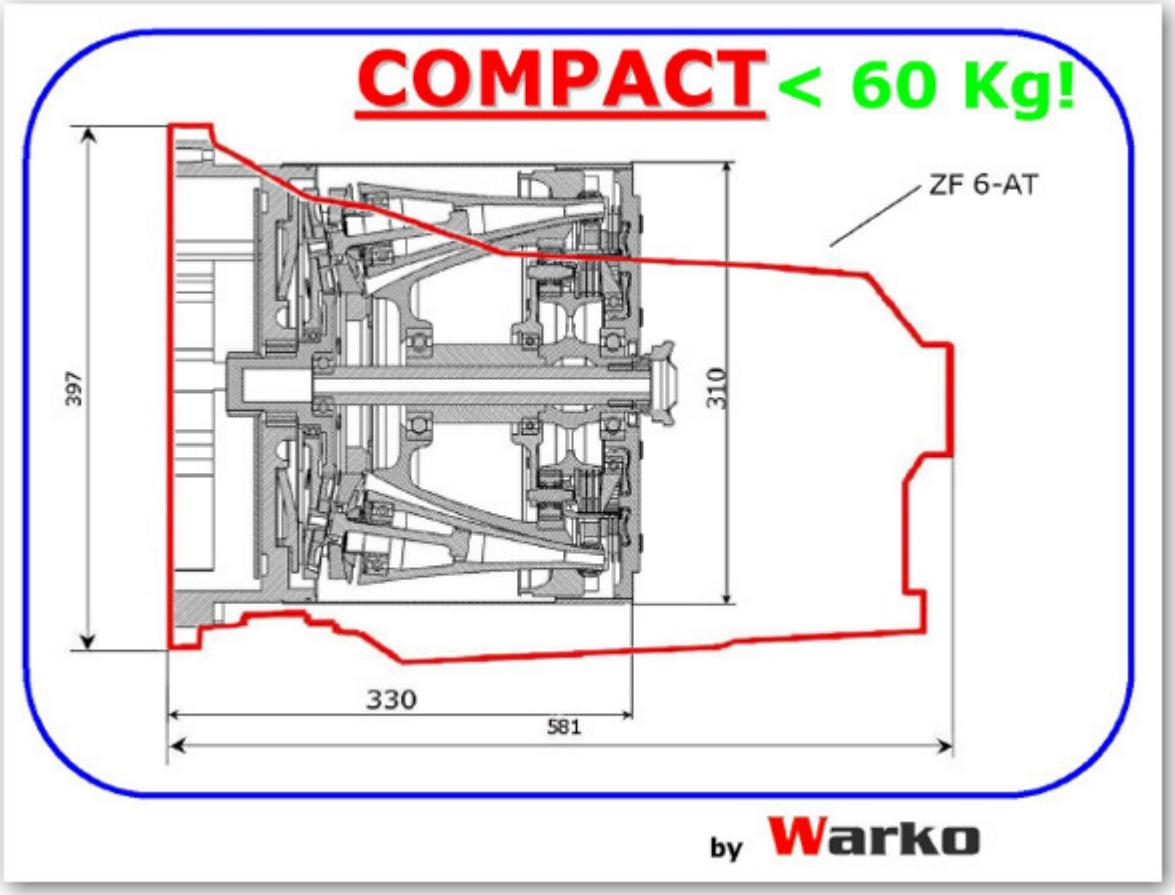
when the engine turns, the variator, in a particolar position of it's range, will compensate the engine revolution having zero turns in output.



Compactness

Warko is compact and light (relatively). It is only 36 cm long, its diameter is 31 cm, and its weight does not reach 60 Kg.

Thanks to its dimentions, Warko can be employed also in front drive vehicles.



Economic

Warko is economic both for manufacturers and users. Manufactured in millions of pieces, and due to the use of commercial steel, its production costs are near to mechanical transmissions.

Moreover, as regards the OEM Design Departement, Warko will be a standard "package" simply to insert in the final project, only designing the final drive ratio.

The use of Warko in a car, sensitively reduces fuel consumption: 15-35%, comparing cars with the same engine and mechanical transmission.