World first: ZF Lenksysteme equips light commercial vehicles with electric power steering

- 0.6 litres less fuel consumption compared with hydraulic power steering
- Reduction in CO₂ emissions
- System capability enables the steering to be networked with driver assistance systems

After the passenger car market, the ZF Lenksysteme Servolectric, which is designed for optimum fuel consumption, is now also conquering the high-volume light commercial vehicle (LCV) business sector. More than 23 million Servolectric power steering systems have already been produced. Of these, around 2.6 million are made in the paraxial design with the highest steering rack force. With minor modifications, this electric power steering system can be adapted for light commercial vehicles. Compared with hydraulic steering systems, the ZF Lenksysteme Servolectric saves around 0.6 litres of fuel in the NEDC (New European Driving Cycle) in urban traffic. A further advantage is the system capability, i.e. networking with electronic assistance systems. This means increased safety and convenience for the customer.
Less fuel consumption - less carbon dioxide
The ZF Lenksysteme Servolectric only needs power when the steering is activated. According to the latest measurements, the electric power steering system saves 0.6 litres of fuel in 100 km compared with hydraulic power steering systems. With an annual mileage of 25,000 km per year, this means a saving of 150 litres of fuel due to the steering alone. With a litre of diesel costing 1.40 euros, this amounts to 210 euros per year. There are also considerable potential savings with regard to CO₂ emissions. The Servolectric produces 16.1 g/km less CO₂ compared with hydraulic power steering. With an annual mileage of 25,000 km, this results in a saving of around 0.4 tonnes of CO₂. The legislator has also decided to introduce an EU-wide CO₂ penalty tax for commercial vehicles which emit more than 147 g/km CO₂. This will come into force in 2014 with a limit of 175 g/km. A staggered introduction will ensure that the limit of 147 g/km is reached step-by-step by 2020. Here too, the Servolectric shows enormous savings potential.

Power-on-demand
The Servolectric is based on the principle of rack-and-pinion steering which, in the case of electric steering, is linked to a servo unit and a highly developed electronics system. As soon as the driver initiates a steering movement, sensors register the appropriate steering torque and steering speed. From this data, a control unit calculates the necessary steering assistance within milliseconds and the servo motor transmits the optimum torque via a recirculating ball gear to the rack of the mechanical rack-and-pinion steering. The power limit of this steering system corresponds to a steering axle load of more than 2,000 kg. However, the electric steering system in parax-
ial design introduced in 2006 offers even more advantages: the space-saving installation due to the absence of steering pump and hoses simplifies assembly and relieves the burden on the environment. Along with passenger car steering systems, the ZF-Servolectric now also covers light commercial vehicles (LCV) such as the Mercedes Sprinter and the Volkswagen Crafter. This versatile steering system can therefore be found in vehicles ranging from the mini class via the medium and luxury class to the transporter.

**System capability allows for safe driving**

The Servolectric can be networked with a number of external systems. Information gathered relating to the steering wheel angle is thus available to other systems such as ESP or an adaptive chassis controller. It also facilitates driving safety functions such as lane departure warning and lane change assistant. Depending on the driving situation, the appropriate system intervenes and recommends a steering correction to the driver by visual, acoustic or haptic signals. It is no longer necessary to hold the steering wheel when using the parking assistant feature. In this case, the Servolectric completely takes over the steering by itself.

**Caption:**

Economic and system-compatible: The Servolectric electric power steering system from ZF Lenksysteme. The power steering makes information available for other safety and driver assistance systems.

Photo: ZF Lenksysteme GmbH
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ZF Lenksysteme GmbH, a 50:50 joint venture between Robert Bosch GmbH and ZF Friedrichshafen AG, is a specialist and technology leader for steering systems with more than 12,300 employees in 16 locations in 8 countries. In 2011, the company achieved a turnover of more than 3.5 billion euros.