TraXon: The new Modular Transmission System – a Success Story Continues

- TraXon now also installed in medium and heavy trucks
- Higher torque and gear spread, best efficiency
- PreVision GPS, the anticipatory GPS-based shifting strategy

ZF presents its new automatic transmission system for medium and heavy trucks. With a completely new basic transmission and a modular concept, TraXon meets the demand of the market for a versatile solution covering a broad range of applications. The innovative transmission combines several contradictions at the same time: It offers higher torques without compromising the power-to-weight ratio, it has a higher gear spread and at the same time improved noise quality, and, depending on the application, it can be driven by a dry clutch but additionally also by a torque converter clutch, or it can be combined with an engine-dependent PTO. For the new transmission, ZF developed the revolutionary PreVision GPS shifting strategy which works in an anticipatory and especially fuel-saving way thanks to a GPS connection and an interface to navigation data.

With the TraXon and a vast number of innovations at the transmission hardware and the control software, ZF sets new standards and enables an enormous functional diversity in the transmission system.

Efficient basic transmission
At the core of the innovation, you will find a basic transmission featuring very compact dimensions with a splitter group, main group, and range change group, as well as two countershafts and one main shaft. It is this space-saving design in combination with the newly designed gearsets that turns the TraXon into a benchmark in terms of the power-to-weight ratio: The new ZF transmission can transmit torques considerably above 3,000 newton meters and is therefore also attractive for markets where vehicles with a gross vehicle weight of 72 tons are used. TraXon
can be obtained with 12 or 16 speeds – both are available as Direct Drive or Overdrive versions; the latter features a particularly long ratio of the highest gear. All versions of the TraXon basic transmission have a very high transmission spacing, enabling the driver to maneuver the vehicle in a balanced and comfortable way without the transmission becoming more prone to wear, e.g. due to excessive load on the clutch.

ZF development engineers managed to considerably reduce the noise development of the TraXon compared to the AS Tronic by an average of 6 dB by introducing a new gearing design, innovations for the transmission housing, and by integrating an anti-rattling damper.

Furthermore, the transmission concept allows for two additional reverse gears. ZF offers the TraXon with a total of four reverse gears as additional option. They enable longer, quicker reversing for special applications. In terms of efficiency, the TraXon basic transmission with a transmission efficiency of about 99.7 percent (DirectDrive) is extremely well positioned compared to the competitors.

The new concentric clutch release unit, ConAct, represents a fundamentally re-engineered clutch release mechanism. It has a push-type clutch design, protected inside the bell housing.

The new TraXon transmission from ZF provides maximum flexibility thanks to a number of available variants and additional modules for wheeled vehicles. The remarkable features of the transmission are its low operating costs and reduced fuel consumption.

**Modular concept with optional units and extension modules**

One essential advantage of TraXon is its modular transmission design. This enables the basic transmission to be combined with three starting or shift modules, respectively, which make the transmission more economical in practice, giving manufacturers
and operators the best possible flexibility for every application, as well as increasing the comfort for the driver.

The dry single-disk or – for particularly high-torque applications – double-disk clutch is robust and has proven worthwhile millions of times over. It is the ideal starting module for daily challenges. Effective transmission of power and a long service life make this starting module the perfect choice for both road traffic and construction site transportation.

It is also possible to combine the TraXon basic transmission with a torque converter clutch for the use in heavy road tractors and trucks. "TraXon Torque" can also start wear-free with high input torques and stands for smooth and comfortable maneuvering at low life cycle costs.

Another option is the engine-dependent PTO. It is installed between the transmission and vehicle engine following the sandwich principle and it is especially attractive for vehicles where the auxiliaries require very high torques regardless of the vehicle speed – for example for special fire trucks, mobile cranes, and concrete pumps.

The transmission is equipped with an optional powerful secondary retarder with a braking torque of 4,000 Nm, the ZF-Intarder. The latter offers enormous advantages compared to other primary retarder systems particularly for brake operations at speeds higher than 25 km/h. It can be combined perfectly with the new generation of engine brake systems with increased braking force. This enables an efficient use of wear-free auxiliary brakes across the entire speed range.

Furthermore, the tried and tested clutch- and drive-dependent power take-off (PTO) range from ZF is still available.

**Versatile functions thanks to control software**
ZF engineers have developed a standard software platform for the transmission control unit that can be used in all TraXon variants. It draws back on a number of sensors to determine the pitch, direction of rotation, or speeds, thereby enabling innovative transmission functions such as the anticipatory shifting strategy, rolling function, rock-free function and more comfort when maneuvering or starting.

The anticipatory GPS-based driving strategy PreVision GPS will prove to be an absolutely trailblazing innovation. ZF thus gives truck manufacturers the opportunity to link up the transmission with GPS data and digital map material. With the corresponding integration in the vehicle, PreVision GPS prevents gearshifts that may be unnecessary within the context of the terrain – for example when a conventional transmission control unit shifts up a gear before an uphill gradient or a narrow bend, just to shift down to a lower gear shortly after.

The new TraXon's rolling function is a sensible feature on slightly sloping roads: The transmission goes out of gear, the driveline is decoupled during the rolling phase, and the engine is running idle – possible drag losses are avoided, leading to corresponding consumption and emission savings. On the other hand, the topography-based control unit immediately detects steep slopes and applies the engine and transmission brake instead of the rolling function in order to preserve the service brakes.

**Caption:**
Added value for medium and heavy trucks: With the modularly designed TraXon transmission system, their operation becomes even more economical.

Photo: ZF
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ZF is a global leader in driveline and chassis technology as well as active and passive safety technology. The company acquired TRW Automotive on May 15, 2015, and integrated it within the organizational structure as the Active & Passive Safety Technology Division. The combined company has a global workforce of around 138,300 at about 230 locations in some 40 countries and reported sales of €29.2 billion in 2015. ZF annually invests approximately 5 percent of its sales in Research & Development (€1.4 billion in 2015) ensuring continued success through the design and engineering of innovative technologies. ZF is one of the largest automotive suppliers worldwide.

Industrial Technology is the division where ZF bundles its activities for “Off-Road” applications. It comprises the development and production of transmissions and axles for agricultural- and construction machinery as well as driveline technology for material handling systems, rail- and special vehicles. The division is also responsible for the worldwide business of marine propulsion systems, aviation technology as well as the development and production of gearboxes for wind turbines and industrial applications. Test systems for all kinds of applications in driveline and chassis technology are also included in the division’s portfolio.

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