Passenger Cars With Efficient ZF Automatic Transmissions now in Demand in all Vehicle Categories

- Modular 8HP transmission kits compatible not only with compact cars and vans, but also sports cars and plug-in hybrids
- 9-speed automatic transmission for front-transverse drive successful in various brands and applications
- High fuel and emissions savings thanks to ZF transmission systems

Automatic passenger car transmissions from ZF have proven highly successful on the market. Since starting volume production of its 8-speed automatic transmission (8HP) in 2009 and up to the end of 2014, ZF has already sold 7.5 million units, with the Saarbrücken, Germany, and Gray Court, South Carolina (U.S.), locations producing more than 2.6 million units annually (status: mid-2015). In vehicles with front-transverse engines, which represent the drive category with the world’s strongest growth potential, ZF technology is also catching on. Roughly two years since the start of volume production of the 9-speed automatic transmission (9HP), it has grown into an international success, currently with three customers and diverse serial applications. With each new transmission generation, ZF has helped reduce fuel consumption and emissions in passenger cars. ZF automatic transmissions additionally provide the highest level of driving comfort and dynamics.

The fact that outstanding drive solutions can always be enhanced was recently made clear by the 8-speed automatic transmission: The second generation of the 8HP has considerably cut fuel consumption compared to the already fuel-efficient first generation by up to three percent. ZF engineers have further improved transmission efficiency and reduced inner drag losses by implementing an entire bundle of measures.
With these extensive further developments, the second generation of ZF’s 8HP is now tailored to current and future vehicle and drive requirements. It stands for reduced fuel consumption, dynamics, and greater comfort as well as flexibility. Since 2009, the first 8HP generation has proven successful millions of times in more than 600 different volume-production vehicle applications – ranging from the compact car, the SUV, and sports car to the luxury class segment. The 8HP also supports hybrid applications, four-wheel drive configurations, and motorsports applications across vehicle segments; it can also be found in high-load van applications.

**Plug-in hybrid transmission based on the 8HP**
The most recent development in the 8HP modular kit is the 8-speed plug-in hybrid transmission. It has a higher battery capacity and its energy storage allows it to be charged from an electrical outlet. To go with it, ZF designed its own plug-in hybrid transmission based on the 8HP, focusing on purely electric driving during development. In the process, design engineers had to keep the drag torque from the separating clutch to the combustion engine as low as possible.

In addition, clearly improved torsional vibrational decoupling better supports the downsizing and downspeeding concept. Compared to the previous generation, the functionality of the starting element has been improved and its comfort increased: Two dampers have been installed to reduce the torsional vibrations of the combustion engine, with one configured as a speed-adaptive damper. This means all current combustion engines can be operated at high load from idling speed without annoying noises or vibrations.

The electric motor, which is designed as a permanent-field synchronous machine (PSM), is integrated fully into the transmission housing and is cooled by atomized oil. The peak output of the electric drive is 90 kW; the constant power is 45 kW.
The integrated starting element is able to transfer 550 Nm of starting torque. It has been possible to improve comfort and robustness compared to the previous generation by introducing a host of measures in terms of mechanics, hydraulics, functionality, and manufacturing.

The ZF drive also gives plug-in hybrid vehicles a purely electric driving range of up to 50 kilometers, depending on the installed battery system. The electric drive is able to reach driving speeds of up to 120 km/h.

9HP is the definitive drive for the front-transverse growth segment
When ZF began producing the world’s first multi-ratio transmission with nine speeds in 2013, a no less important piece of information almost took a backseat. Namely, that unlike the previous 6- and 8-speed automatic transmissions equipped with a standard driveline, a longitudinal engine, and rear-wheel drive, ZF designed the 9HP for vehicles with front-transverse drivelines. Automotive experts are forecasting that this configuration will see the best growth rates on a global level. This was one of the defining reasons why ZF returned, after a long absence, to the very competitive field of front-transverse automatic transmissions. ZF confirms in its strategy not only the growth in this segment overall, but also the increasing level of automation across all front-transverse applications and beyond. It is clear that the popularity of automatic transmission systems has increased considerably. Drivers of all vehicle classes value the outstanding comfort together with the highest efficiency and dynamics.

Since its market launch in 2013, the most recent ZF automatic transmission was introduced in many volume-produced vehicles in extremely diverse vehicle categories, ranging from the compact SUV to the compact sedan or cross-over models. Also, the customer list shows that the 9HP is not only moving in the premium segment, but also in the direction of volume models – a
tendency that the strategic logic behind the introduction of the 9HP confirms.

The conditions for this are good and lie, above all, in the fuel efficiency of the 9-speed automatic transmission, but also in its versatility due to its modular kit principle. Because the electronic control unit, also developed and produced by ZF, fully leverages the high spread between the nine speeds, the transmission mostly keeps the engine in a fuel-efficient operating point. This means that a vehicle with the 9HP at a constant speed of 120 km/h consumes up to 16 percent less fuel than the usual 6-speed automatic transmissions previously used in this segment. Thanks to its modular principle, the basic transmission can be upgraded as needed. This means that different starting elements and four-wheel drive applications can be installed cost-efficiently even in the tight installation space of front-transverse passenger cars. ZF has also added to its portfolio the ECOnnect drive system that can be decoupled and is customized to the demands of four-wheel drive vehicles with front-transverse engines. Thanks to its demand-driven activation of the four-wheel drive, the drag losses have been considerably reduced – which has resulted in fuel and emission savings of up to five percent. Moreover, the standard 9HP is start-stop capable.

Captions:
1.) Best seller for the standard driveline: ZF currently produces around 2.6 million units of the 8HP 8-speed automatic transmission every year. Thanks in no small part to its high fuel efficiency.
2.) For vehicles with front-transverse engines: ZF’s 9HP 9-speed automatic transmission allows the engine to run in the most fuel-efficient speed range, thus promoting fuel economy.

Photos: ZF
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