Land Rover Equipped With 8-Speed Hybrid Transmission by ZF

- **Plug-in hybrid based on the Range Rover Sport**
- **Prototype consumes 3.36 liters per 100 kilometers only**
- **Basis of the driveline concept is the parallel hybrid variant of ZF's 8-speed automatic transmission**

In Geneva, Land Rover presented the prototype Range_e that is based on the well-established Range Rover Sport. With a total system power output of 249 kW (339 hp) and a range of up to 1112 kilometers, the luxury SUV convinces as parallel hybrid with plug-in option. The Range_e achieves its high energy efficiency thanks to the 8-speed hybrid transmission by ZF.

High power reserves and low fuel consumption: with the Range_e, Land Rover demonstrated at this year's Geneva Motor Show that it is by all means possible to combine these properties in one vehicle. After all, the prototype needs only 3.36 liters of fuel per 100 kilometers in the cycle. For this purpose, the Land Rover engineers coupled the 180 kW (245 hp) diesel engine with the 8-speed hybrid transmission (8P70H) by ZF. For this ZF hybrid solution, the combustion engine and the electric drive are connected in parallel and can be used together or independently of each other. The ZF hybrid transmission houses the electric motor, separating clutch, torsional damper, and hydraulics in a very small installation space where, in a conventional driveline, the torque converter is usually mounted. The starting clutch was integrated in the transmission. The electric motor by ZF Sachs uplifted to 69 kW (94 PS) in the prototype, serves as electric motor and generator at the same time. By means of a separating clutch, the combustion engine can be completely decoupled from the rest of the driveline. Due to this decoupling, the high drag torque of the combustion engine is omitted in the electric-only driving mode and during recuperation (regaining of braking energy), a fact that has a positive effect on fuel consumption. All in all, the Range_e has a range of 1112 kilometers and allows 32 kilometers of electric-only operation.

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Thanks to the plug-in option, the lithium-ion batteries are not only powered by the electric motor, but can additionally be charged at every conventional 240 V power outlet.

The 8P70H ZF hybrid transmission is based on ZF's standard 8-speed automatic transmission (8HP). Due to its modular set-up, it has already been designed for hybridization; for this reason, the full hybrid version can be integrated in the same installation space as the standard version of the 8-speed automatic transmission. At the same time, the transmission possesses all prerequisites on the output side to be configured directly for the all-wheel drive of the Range_e.

Also the operative control functions for the hybrid transmission come from ZF: Only by means of this functional networking, an efficient hybrid management of the entire system can be established that enables a flexibly adjusted and intelligent power distribution of both drives.

Depending on the driving situation and the road surface, the hybrid master decides which drive is adequate and selects the most efficient combination of Diesel engine and electric motor. But the Range_e is more than just an showpiece at a trade fair: for months, several prototypes have been collecting test kilometers and thus lay the ground for the market launch of a Land Rover Plug-in Hybrid.

Caption:
The ZF hybrid transmission houses the electric motor, separating clutch, torsional damper, and hydraulics in a very small installation space where, in a conventional driveline, the torque converter is usually mounted.

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ZF is a leading worldwide automotive supplier for Driveline and Chassis Technology with 123 production companies in 27 countries. In 2010, the Group achieved a sales figure of EUR 12.9 billion with approximately 64,000 employees. In order to continue to be successful with innovative products, ZF annually invests more than five percent of its sales (2010: approx. EUR 750 million) in research and development.

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