



E-Power for the Dunes: ZF and MKR Technology Reveal the World's First Hybrid Drive for the Dakar Rally

- **Together with MKR Technology, ZF is electrifying the off-road truck for the Riwald Dakar racing team**
- **CeTrax Lite RS provides a peak performance of 150 kW and 1,400 Nm of additional torque**
- **After just six months of development time, the new driveline is set for the starting line**

Friedrichshafen / Jeddah, Saudi Arabia. A world premier at the Dakar Rally: ZF has developed a new hybrid driveline for the most famous off-road race in the world. The CeTrax Lite RS electric drive gives the Riwald Dakar team's all-wheel drive truck an additional 80 kW of cruising power, a peak performance of 150 kW and 1,400 Nm of torque.

When the starting pistol is fired for the 42nd Dakar Rally at the beginning of January, MKR Technology, ZF and the Riwald Dakar team will make history together: the first ever hybrid-powered off-road truck of the racing series will start in Jeddah, Saudi Arabia. For this world premiere, ZF, in cooperation with MKR Technology, has fitted the Riwald Dakar team's Renault C640 with a new driveline developed especially for this objective. The core of this driveline is a special prototype of ZF's central electric axle drive, reconfigured in terms of its hardware and software to make it fit for a rally. The final product is called CeTrax Lite RS.

Tough testing, top performance

CeTrax Lite RS supports the main diesel unit by providing an additional 1,400 Nm of torque, a cruising power of 80 kW and a peak output of 150 kW. Developing a specific gear ratio proved to be a tough challenge. The 13,000 rpm asynchronous electric motor had to be adjusted to the 2,700 rpm that the 1,000 HP diesel engine produces at



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the transmission output. In addition to the electric motor, ZF also supplies integrated power electronics and the hybrid control unit, including the software that has been programmed specifically for the Dakar Rally. An automatic transmission from ZF is also installed in the driveline. This transmission funnels the horsepower from the diesel engine with utmost efficiency. Power from the combustion engine and e-unit enter the ZF transfer case converting the Renault truck into an all-wheel off-road vehicle.

This race truck exemplifies ZF's claim to develop e-mobility technology for every vehicle segment. The company immediately responded to the racing team's challenge of finding a new drive solution. "The extreme conditions of the Dakar Rally – lots of sand and rough terrain – offer us a unique and amazing opportunity to subject our hybrid driveline to the ultimate acid test", states Ralf Boss, Director of Special Vehicle Systems at ZF. This bodes well for series potential in other demanding applications with special vehicles.

High-speed racing, high-speed development

The Riwald Dakar Team and their driver Gert Huzink are the only participants entering Dakar 2020 with a hybrid electric vehicle. In addition to demonstrating the partners' commitment to sustainability, the first tests show that this pioneering vehicle could come out on top at the finish line. On test circuits in Poland, France and the Netherlands, the team was able to snatch a few seconds off their usual times. Besides the extra power, the time advantage is due the recuperation effect of the electric motor. This means that the brakes can be actuated later and harder, allowing the vehicle to be driven at its limit speed for longer. "The components simply work with each other in perfect harmony", says Mario Kress, Chief Designer and owner of MKR Technology. "We're excited about how quickly and effectively the CeTrax Lite RS boosts the trucks performance." In addition, the 400 V battery can be recharged quickly while driving so that it can deliver another bout of massive torque by the next dune ahead.



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The development pace of the new driveline met the speed the vehicle tore around the test circuit. Only a few months passed between the start of the project and the first trials. The trial runs were completed quickly too: The new hybrid drive won over Riwald, MKR and ZF with its performance and robustness, and the trio approved it for the rally after just four weeks.

The Dakar Rally will take place in Saudi Arabia from January 5 to 17, 2020.

Caption:

- 1) More e-power for the desert: The Renault C640 from MKR Technology and Riwald Dakar is the first hybrid truck in the history of the Dakar Rally.
- 2) CeTrax Lite RS from ZF supplies an additional 1,400 Nm of torque, a cruising power of 80 kW and an electric peak output of 150 kW to the driveline.

Images: MKR Technology (1), ZF (2)

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ZF is a global leader in driveline and chassis technology as well as active and passive safety systems. The company has a global workforce of 146,000 with approximately 230 locations in some 40 countries. In 2017, ZF achieved sales of €36.4 billion. ZF is one of the largest automotive suppliers worldwide.



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ZF allows vehicles to see, think and act. The company invests more than six percent of its sales in research and development annually – in particular for the development of efficient and electric drivelines and also in striving for a world without accidents. With its broad portfolio, ZF is advancing mobility and services in the automobile, truck and industrial technology sectors.

For further press information and photos, please visit: www.zf.com