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# **Ferrari Debuts Hy-Kers In The 599**



Ferrari presents a vettura laboratorio (experimental vehicle) at the 80th edition of the Geneva Motor Show based on the 599 GTB Fiorano equipped with an advanced new hybrid transmission. Hybrid technology is one of the solutions examined by Ferrari in its on-going research and development into making its production cars ever more efficient. The HY-KERS displayed at the Geneva Motor Show is an example of how Ferrari is studying the application of hybrid technology to high-performance sports cars. Central to Ferrari's objectives is maintaining the balance, handling and performance characteristics typical of its cars despite the inevitable disadvantages in terms of weight represented by applying hybrid solutions to existing models.

To this end Ferrari has employed its racing experience to adapt a lightweight hybrid drivetrain to the [Ferrari 599 GTB Fiorano](#) with the aim of ensuring that vehicle dynamics are unaffected. This was achieved by the careful integration of all system components, positioning them below the centre of gravity and ensuring that interior and luggage space are entirely unaffected. Similarly the flat lithium-ion batteries are positioned below the floorpan of the car inside the aerodynamic underbody. The result is a centre of gravity that is even lower than in the standard car. In addition, a part of the weight gained by fitting the electric motor, generator and the batteries is offset by being able to do away with the traditional starter motor and battery.

Ferrari has also applied its F1 technology to the design, engineering and construction of a new kind of electric motor which also helps optimise the longitudinal and lateral dynamics of the car, enhancing traction and brake balance. The motor cuts in during acceleration, providing instantaneous torque when moving away from a standstill and during overtaking manoeuvres, with torque control a function of grip, gear and accelerator pedal angle. Depending on vehicle speed and engine load – for example in town driving – the hybrid system can also function as a full-electric drivetrain. The result is a direct reduction in consumption and emissions. The motor also features a unique cooling and lubrication system for maximum efficiency under all operating temperatures and loads. The castings of the motor are made in the Ferrari foundry, complete with Prancing Horse motif.

Weighing about 40 kg, the compact, tri-phase, high-voltage electric motor of the HY-KERS is coupled to the rear of the dual-clutch 7-speed F1 transmission. It operates through one of the transmission's two clutches and engages one of the two gearbox primary shafts. Thus power is coupled seamlessly and instantaneously between the electric motor and the V12. The electric motor produces more than 100 hp as Ferrari's goal was to offset every kilogram increase in weight by a gain of at least one hp.

Under braking the electric drive unit acts as a generator, using the kinetic energy from the negative torque

generated to recharge the batteries. This phase is controlled by a dedicated electronics module which was developed applying experience gained in F1 and, as well as managing the power supply and recharging the batteries, the module also powers the engine's ancillaries (power steering, power-assisted brakes, air conditioning, on-board systems) via a generator mounted on the V12 engine when running 100 per cent under electric drive. It also incorporates the hybrid system's cooling pump.

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