

## Electricity in the blood

**A small device with a big impact: The IVT current measuring technique from Isabellenhuetten can even be found in racing cars today.**

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Largely unnoticed by the public, the family-run company from Dillenburg in Hesse has become an FIA (Fédération Internationale de l'Automobile) partner in recent years. It is a commitment from which Isabellenhuetten has already gained valuable insights in Formula One for the mass production of precision measurement systems. They have now been doing this in the high-performance environment of Formula E since 2014 as well.

Andreas Lepper, the project manager of the IVT-F development team at Isabellenhuetten, coordinates the cooperation with the FIA. "The cooperation essentially began almost 10 years ago," said the 37-year old electrical engineer. "That is when the McLaren Formula One team approached us. At the time, the McLaren location in Woking, England was looking for a current sensor for the first hybrid system to be used in a Formula One racing car."

Motorsports fans know this system under the name Kers (kinetic recovery system).

A look back: The Formula One team McLaren gained an advantage already in 1998 by using the energy recovery system, but just for a single race and then it was banned again. "As we know today, however, that was not the end of Kers." For commercial and environmental reasons, the concept of the energy recovery system ultimately made sense. That is why there would be another Kers revival 10 years later. And again it was McLaren who advanced this new technique. "At the time, we were working together with a British company that specialized in prototype design and that provided the measurement technique for this purpose. McLaren also relied on its services. And that is how the first contact came about," explained Lepper.

And like in a déjà vu, McLaren also left the competition in the dust in 2009 by using the Kers again. "This was an achievement of the IVT measurement technique," explained Lepper. The other teams were less excited about it. The result: In a gentlemen's agreement, the team bosses agreed to no longer use Kers. It was first in 2011 that the FIA officially allowed the use of Kers. In 2014, it was ultimately replaced with ERS (energy recovery system). The advanced energy recovery system now not only converted braking power into energy, but also extracted additional power from the exhaust fumes.

### IVT measurement technique comes into play

To ensure that no team could gain an advantage, the FIA required a complete and transparent data collection of the amount of energy that flows into the drive train as soon as the driver activates the ERS. Since then, energy volumes and opening times of the ERS window have been detected, recorded and issued by the IVT measurement technique in Formula One.

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*Andreas Lepper (left) and Florian Simon test the IVT-F measurement system for Formula E (Photo: Isabellenhuetten)*