



Communications Motorsport

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Audi achieves pioneering feat with e-tron quattro four-wheel drive

- **Trendsetter Audi: four-wheel drive also established in LMP1 sport**
- **New development of e-tron quattro four-wheel drive system for 2014**
- **34 years of four-wheel drive expertise in production and motorsport**

Ingolstadt, March 9, 2014 – Audi has set another trend in motorsport. After the brand revolutionized rally racing with quattro four-wheel drive in the nineteen-eighties and significantly shaped touring car racing with this system in the nineties, four-wheel drive has been making its way into LMP1 sports prototypes as well. The Audi R18 e-tron quattro now aims to extend ‘Vorsprung durch Technik’ with a system featuring an all-new development.

In 2012, Audi became the first manufacturer to win the Le Mans 24 Hours and the FIA World Endurance Championship (WEC) with a four-wheel-drive LMP1 sports car. Equipped with the innovative e-tron quattro four-wheel drive, the R18 has won ten WEC rounds to date including the 2012 and 2013 Le Mans 24 Hours plus the WEC World Champion’s titles in the same years. In 2014, for the first time, Audi’s two LMP1 challengers on the manufacturers’ side are also relying on LMP1 sports prototypes with four-wheel drive.

“Innovations only become pioneering achievements when they’re successfully used and others start to adopt them,” says Head of Audi Motorsport Dr. Wolfgang Ullrich. “Audi, like no other manufacturer, has repeatedly achieved such feats ever since the debut of quattro four-wheel drive in 1980.” In the DTM, as well, Audi was the first team in 1990 to use four-wheel drive in racing, just like in Super Touring Cars, starting in 1993. In the past two years, on achieving the string of success in the WEC, the brand proved that e-tron quattro – the combination of a hybrid system with four-wheel drive – offers significant advantages.

Up to now, Audi had been allowed to use four-wheel drive only above 120 km/h. But four driven wheels promise to deliver traction advantages particularly at low speed, for instance when the driver accelerates on exiting a tight corner. This year, this speed-related rule no longer applies.



A fundamentally new Motor Generator Unit (MGU), together with a differential, sits in the monocoque at the level of the front axle. Two drive shafts connect the system with the front wheels. Under braking, the kinetic energy of the race car is converted into electric current which flows into an optimized flywheel energy storage device located in the cockpit next to the driver. During acceleration, the recovered energy is converted again by the MGU and powers the front wheels.

“We’ve developed the entire hybrid drive from scratch again for 2014,” explains Dr. Martin Mühlmeier, Head of Technology at Audi Sport. “Specifically, it’s become even lighter and more efficient than before.” As of 2014, a single e-machine connected to a front-axle differential is longitudinally mounted. Furthermore, these front-wheel drive components are completely integrated into the monocoque of the R18 e-tron quattro. The recuperated energy is stored in a newly designed flywheel energy storage system.

While the quattro systems of Audi’s factory-fielded rally models and touring cars between 1980 and 1997 used a mechanical connection in the form of a drive shaft between the front and rear axles, the power distribution to the front and rear wheels in the e-tron quattro four-wheel drive system is governed strictly by an electronic control unit. In addition, due to the new efficiency regulations, a modified strategy for the engine and drive system will be used in 2014. The e-tron quattro four-wheel drive with its sophisticated energy flow is characterized by optimum efficiency.

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Note to editors: Every Monday until the Le Mans race on June 14/15, we will be providing you with new background information on the R18 project and Audi’s commitment in the world’s most famous endurance race. Next week’s topic: the LMP partners.

The Audi Group delivered around 1,575,500 cars of the Audi brand to customers in 2013. From January through the end of September 2013 the Company posted revenue of €37 billion and an operating profit of €3.74 billion. The Audi Group is globally present in more than 100 markets and produces vehicles in Ingolstadt and Neckarsulm (Germany), Győr (Hungary), Brussels (Belgium), Bratislava (Slovakia), Martorell (Spain), Kaluga (Russia), Aurangabad (India), Changchun (China) and Jakarta (Indonesia). The brand with four rings produces cars also in Foshan (China) since December 2013, in 2015 in São José dos Pinhais (Brazil) and 2016 in San José Chiapa (Mexico). AUDI AG’s wholly owned subsidiaries include quattro GmbH (Neckarsulm), Automobili Lamborghini S.p.A. (Sant’Agata Bolognese, Italy) and the sports motorcycle manufacturer Ducati Motor Holding S.p.A. (Bologna, Italy). The Group currently employs almost 73,000 people worldwide, including around 50,000 in Germany. Total investment of around €22 billion is planned from 2014 to 2018 – mainly in new products and sustainable technologies. Audi lives up to its corporate responsibility and has strategically established the principle of sustainability for its products and processes. The long-term goal is CO₂-neutral mobility.