

Topic Preview MTZ 07.-08.2024

COVER STORY | PASSENGER CAR DRIVES

Concept of an In-rotor Inductive-excited Synchronous Motor
ZF has upgraded the magnet-free electric motor topology of the separately excited synchronous machine so that it operates at the performance level of electric motors with permanent magnets for passenger car drives. An essential part of this was an inductive power transmission system, which was developed in an interdisciplinary multi-domain approach across disciplines and is used in a new concept called I²SM.

Next Generation Integrated Drive Module for Electric Vehicles
BorgWarner has further developed its integrated electric drive module for passenger cars and designed it for a system voltage of 800 V. The new iDM180-HF drive unit uses a smaller and higher-speed electric motor in combination with a long ratio two-speed high-ratio gearbox, which allows for packaging and cost advantages.

Interview with Univ.-Prof. Dr.-Ing. Thomas von Unwerth, Managing Director of the Institute of Automotive Research – Alternative Vehicle Drives at Chemnitz University of Technology.

IN THE SPOTLIGHT

Seize the Opportunities of a Grid-supportive Charging Infrastructure Now
The production costs of electricity from renewable sources can fall into negative figures on some days in Germany. This is one of the reasons why a multi-billion-euro market for electrical storage has developed. Now electromobility is also benefiting from this. Some charging parks are using the EPEX electricity spot market to recoup their high investments in the shortest possible time.

DEVELOPMENT | COMPONENTS

Pressure Equalization Element for Electric Axles and Gearboxes
Apart from an elaborate hose construction, there was no simple technical solution for wading through water safely. Konzelmann has developed a pressure equalization element directly integrated into the transmission. It prevents both positive and negative pressure within sealed housings in electric axles and differentials, offering new perspectives for reducing production costs and time to market.

ENERGY STORAGE

Cell Chemistry Development for Traction Batteries at Mercedes-Benz
Cells are the smallest energy storage units in a traction battery and constitute the key component of the entire application of battery-electric vehicles. In this connection, Mercedes-Benz is developing the electrochemical properties of the cell internally and carving out the unique characteristics of the distinguishing features step by step. The focus is on innovative and high-performance, but also on cost-efficient and sustainable energy storage materials.

RESEARCH | THERMAL MANAGEMENT

Direct Cooling of Electric Machines for Vehicles under Long-term Testing in Climatic Limit Operation on a Test Bench
Today's e-machine cooling systems are mostly based on the concept of indirect cooling. A direct cooling system dissipates the heat where it is generated, enhances the cooling effect, requires less weight, and thus increases vehicle efficiency. However, any potential water ingress into the oil-based cooling medium must not adversely affect electrical components. The University of Stuttgart and Porsche have therefore developed a test bench to investigate the oil-based direct cooling of an electric machine and countermeasures to prevent water ingress during long-term operation in extreme climatic conditions.

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Contact



Frank Nagel
Media Sales
+49 (0) 611.7878 395
frank.nagel(at)springernature.com