

Development of New Motor for Electrification Vehicle

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To comply with the even stricter fuel economy regulations as of late , on the other hand, demand of Electrification Vehicle is expanding all over the world. Toyota has developed a fifth generation hybrid vehicle series. This paper describes the new motor for new NOAH and VOXY. While achieving higher torque and higher output than the former motor, stator structure, magnetic circuit was improved to aim at low loss and size reduction.

Figure 1 shows the main model of the new motor & generator. Motor stator is shown in Fig.2. By adopting newly developed stator and rotor with new material magnet, the new motor achieved high torque, high output, size reduction and low-loss. The new motor adopted fractional pitch winding, and reduced resin insulator by use the foaming insulation paper due to fix the coil and core. As a result coil end size reduced 18% compared to old model.(Fig.3) Considering stator and rotor core usage in motor, high strength e-steel is developed. The new motor adopted both the rotor core to have high strength by small grain size and stator core to have a low-loss by big grain size after post-annealing .

From the development of new motor, the motor loss was reduced 19% compared to old model, and increased the power more than 30% compared to old model.

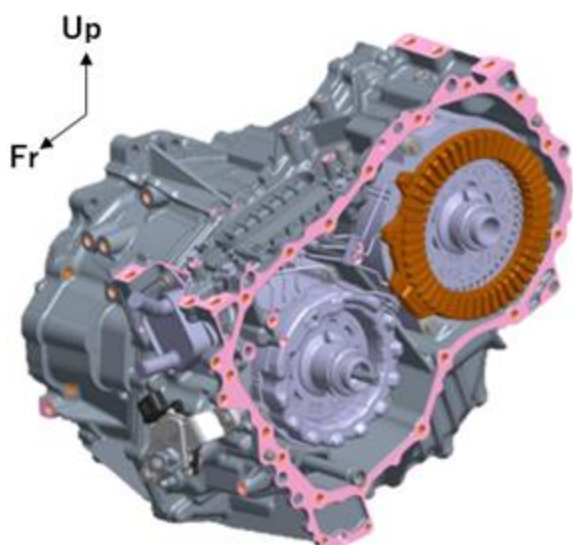


Fig.1 Model of the new Motor & Generator



Fig.2 Motor Stator

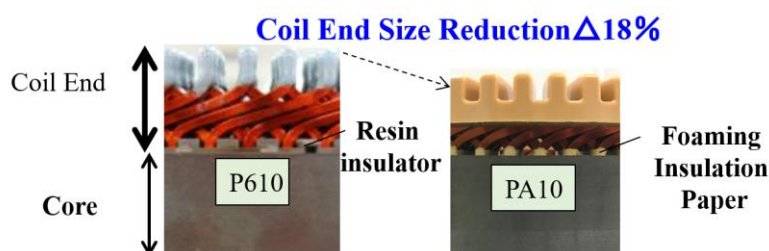


Fig.3 Coil End Size of full-pitch winding and fractional pitch winding