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Tue-Mo-Po2.12-07 [105]: Optimized Design of Permanent Magnet Considering Thermal Demagnetization Analysis of Synchronous Motor

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EV & HEV are being studied to increase fuel economy and driving efficiency in a variety of ways. Especially, mechanical compressor is critical reason of reducing fuel efficiency. The brushless direct current motor (BLDC) is considered as the most suitable model to satisfy the characteristics of electric compressors. Segmented permanent magnet was used to improve the efficiency of the electric-driven compressor of electric vehicles motor. It is one of the methods for reducing the eddy current loss. In this paper analysis precision analysis design according to winding pattern. Therefore, this paper proposes optimal structure that minimizes eddy current loss and irreversible demagnetization characteristics of permanent magnet. Recently, permanent magnet type motors have been mainly studied for output increase motor for electric compressors. The irreversible demagnetization characteristics of magnets, which is one of the factors that determine the performance of a motor, should be carefully analyzed and designed. The occurrence of irreversible demagnetization in a permanent magnet can be largely divided into two types: an external demagnetization field and demagnetization phenomenon by temperature change. Therefore, an optimal design is analyzed the demagnetization reliability of permanent magnet based on these factors. The maximum efficiency was analyzed by consider the shapes of various magnets.And Rare earth magnets are used in motors that generate high efficiency and output characteristics. However, it is vulnerable to irreversible demagnetization at high temperatures. Therefore, we studied optimal design after analyzing the characteristics of demagnetization at external magnetic field and high temperature. The irreversible demagnetization characteristics of the permanent magnets were analyzed using a split magnet. The characteristics of output power according to concentration winding and distribution winding and irreversible demagnetization characteristics of permanent magnet was analyzed. Back_EMF was compared to analyze the permanent magnet demagnetization ratio. The ANSYS Electromagnetic Suite 19.0 was used to analyze irreversible demagnetization under driving conditions.

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