BQ07

Reduction of the Cogging Force at a Moving-Coil-Type Slotless Linear Synchronous Motor

Yong-Jae Kim[1]*, Youn-Ok Choi[1], and Masaya Watada[2]

[1]Department of Electrical Engineering, Chosun University, 375, Seosuk-dong, Dong-gu, Gwangju 501-759, Korea
[2]Department of Biomedical Engineering, Musashi Institute of Technology, 1-28-1 Tamazutsumi, Setagaya-ku, Tokyo 158-8557 Japan

*Corresponding author: Yong-Jae Kim, e-mail: kimyj21@chosun.ac.kr

Recently, permanent-magnet-type linear synchronous motors (PM-LSMs) are used as a driving source for transportation systems to satisfy requirements such as high-speed, low noise, and simplification of the driving apparatus for transportation systems, and to simplify maintenance. PM-LSMs are classified into two types of motors with the core and coreless motor types. Motor types with the core have a large thrust force, but it is problem to produce thrust force ripples from the cogging force. Coreless motor types have excellent control without the cogging force in spite of the lower thrust force. From these results, coreless motor types are utilized in fields of semiconductor production process and short-distance transportation systems. However, coreless motor types can not utilize the thrust force efficiently in contrast with motors with the core because most of generated magnetic flux is leaked out. Therefore, the moving-coil-type slotless linear synchronous motor (moving-coil-type slotless LSM) is proposed to decrease the cogging force, the defect of motor types with the core, and increase the generated thrust force, the defect of coreless motor types [1, 2]. Fig. 1 shows a moving-coil-type slotless LSM. However, the moving-coil-type slotless LSM also generates the cogging force because of position between a permanent magnet of the primary side and a back-yoke of the secondary side when a secondary side is moved. The cogging force acts as the major factor of vibration and noise and causes step out due to load disturbance. Therefore, the reduction of cogging force is highly desirable and this allows stable drive. In order to decrease the cogging force of the moving-coil-type slotless LSM, we researched a method which regulated the length of back-yoke of the secondary side. This paper presents experimental results of length regulation of back-yoke at the secondary side to decrease cogging force in the moving-coil-type slotless LSM.

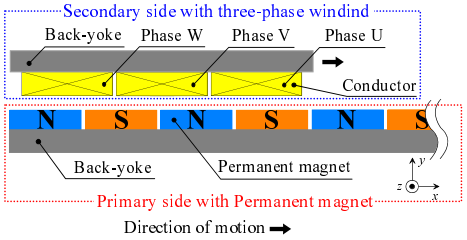

Fig. 1. the moving-coil-type slotless LSM.

REFERENCES

[1] .S. Low *et al.*, IEEE Tran. Industry Appl. 3, 43 (1997).
[2] S. Y. Jung *et al.*, IEEE Tran. MAG. 37, 3757 (2001).

BQ08

Withdrawn