

## Commutation Arc Characteristics of a Fuel Pump Motor in Ethanol

Koichiro Sawa and Tsunashi Hara  
Keio University

In an automotive fuel pump system, a small DC motor is widely used to drive the pump. On the other hand it is well known that ethanol and other alternative fuel are seriously discussed due to oil shortage in future and environmental viewpoint.

The fuel pump motor is installed in a fuel tank, so that the coil current is commutated in fuel, generally gasoline. So far the authors have been investigating commutation arc phenomena in gasoline.

In this research, commutation arc characteristics are examined in ethanol by using an equivalent commutation circuit. Consequently an arc voltage is found to be slightly higher in ethanol than in air, but not as high as in gasoline. Damage of brush and commutator in ethanol is investigated, especially in wear of brush and commutator. The wear of brush is found to become larger in ethanol than in gasoline.

### Corresponding author

Koichiro Sawa

Affiliation: Shin-Kawasaki Town Campus K-201. Keio University

Address: 7-1 Shin-Kawasaki, Saiwai-ku, Kawasaki 212-0032

JAPAN

Phone: +81-44-580-1612

Fax : +81-44-580-1590

E-mail sawa@sd.keio.ac.jp