9.5 Influence of Nickel Content on Various Characteristics of AgNi Contacts for Electromagnetic Contactors

Kiyoshi Yoshida†, Koichiro Sawa †,‡, Kenji Suzuki††, Kouetsu Takaya††, Nippon Institute of Technology, 4-1 Gakuendai, Miyashiro-machi, Saitama-ken, JAPAN
Professor Emeritus of Keio University
Fuji Electric FA Components & Systems Co., Ltd., Konosu-shi Saitama-ken, JAPAN
E-mail: yoshida@nit.ac.jp, sawa@sd.keio.ac.jp

Abstract—The silver nickel contact material is widely used as contacts of the electromagnetic contactor. Experiments have been carried out to clarify the influence of nickel content on various characteristics, such as arc duration, contact resistance, arc energy and electrode mass change. There are six kinds of contacts used, that is, Ag, AgNi5%, AgNi10%, AgNi15%, AgNi20%, and AgNi30%. The source voltages are DC-100V, load current is set to 5A constant, and an electromagnetic contactor is operated continuously up to 100,000 times by generating only break arc. Consequently, it can be made clear that arc duration is almost the same, about 3.2ms at all nickel content. However, the contact resistance becomes larger as the nickel content increased. Further, the relation between electrode mass change and arc energy is experimentally obtained. The cathode loss per unit arc energy is minimized when the content of nickel is 20%, it is about 0.08ug/J. On the other hand, the maximum of the cathode loss per arc energy is 0.14ug/J at the nickel content of 5%.