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Discharge Phenomena at Breaking Contacts of Inductive Circuits

Atsuo TAKAHASHI*

The boundary domain between steady arc and the interrupted arc at the breaking contacts of inductive circuits is investigated by varying contact current, circuit capacitance and local inductance. Moreover, the characteristics of interrupted arc initiated below the minimum sparking voltage, are also studied experimentally.

The main results are as follows,

- (1) The boundary between steady arc and interrupted arc is determined by the charging current of the main circuit capacitance.
- (2) Arc extinction current is not constant, and is dependent upon the contact current and local inductance. This seems to be attributed to cleaning action of the electrode surface by the arc.
- (3) Atall's theory concerning interrupted arc is confirmed, when the arc initiation voltage is below the minimum sparking voltage.
- (4) Interrupted arc voltage is not constant, whereas steady arc voltage is substantially constant. This seems to be connected with the characteristics of high frequency large current arc.
- (5) The first arc initiation voltage in the region of interrupted arc, depends upon the contact current. This shows the first gap length made by breakdown of bridge is a linear function of the contact current.

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