ARC ROOT COMMUTATION FROM MOVING CONTACTS IN LOW VOLTAGE DEVICES

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Abstract

This paper focus on the arc commutation from a moving contact and in particular on the anode motion of a high current arc in low voltage current limiting circuit breakers. Recent investigations have observed that the anode arc root motion is affected by arc chamber geometry. It was previously assumed that cathode root motion was the dominant process. The study uses a flexible test apparatus with a solid state high speed imaging system. The experimental results presented show the influence of arc chamber venting, current level, current polarity and contact velocity on arc motion, particular emphasis is made to the anode motion. The physical process occurring in the anode root are discussed and related to the observed motion. The results show that the anode root is retarded at the tip of the moving contact and that this is primarily related to the venting process in the arc chamber.

INFLUENCES ON THE LENGTH AND SEVERITY OF INTERMITTENCES IN ELECTRICAL CONTACTS

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Abstract

This paper deals with short-duration high contact voltage-drops in static electrical contacts during fretting experiments on tin-plated terminals. The focus lies on the rate of high voltage-drop events over the fretting cycle, the maximum level of voltage-drops, the influence of current and the influence of the direction of relative movement

The parameters used for measuring the contact voltage-drop are an open circuit voltage of 14 V, a nominal current of 9 mA, 29 mA, 54 mA and 92 mA, an amplitude of fretting motion of 0.2 mm and a maximum velocity of relative movement between the contact partners of 100 µm/s. The contact force is 500 mN ± 50 mN.

It is shown that high voltage-drop events occur in clusters, not as isolated events. The nominal current through the contact as well as the open circuit voltage have an influence on the occurrence of these events. Two different shapes of events have been identified, suggesting different mechanisms of conduction.