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Thu-Mo-Po4.11-09 [82]: Operating characteristics of arc-induction type DC circuit breaker with permanent magnets

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We propose arc-induction type DC circuit breaker combining the magnets as the mechanical circuit breaker suitable for the DC system. This circuit breaker simply composes the mechanical contacts, the induction needle, the ground wire and magnets. The arc is moved the induction needle according to the Lorentz's force and it is inducted to the induction needle. The induced arc is flowing into the ground through the ground wire and extinguished. Lorentz's force is occurred depending on appeared arc between contacts and the magnetic field of the magnets. In this paper, we analyzed the characteristics of operating cut-off for arc-induction type DC circuit breaker combining the magnets using the Maxwell program. We studied the arc's moving, that designed a simulation model and analyzed the flow of the electrical field according the moving the contacts. Also, we fabricated the prototype based on the simulation results and tested cut-off operation. As a results, we confirmed that the electrical force was increased about 48% in the induction needle according the combined magnets from the simulation. In addition, we got the results that the speed of the cut-off was faster about 56% according the combined magnets from the experiment.

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