Universität Basel

Publication

A Novel Vacuum Interrupter Contact Design for Improved High Current Interruption Performance Based on a Double-TMF Arc Control System

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 3705070
Author(s) Lamara, Tarek; Hencken, Kai; Gentsch, Dietmar
Author(s) at UniBasel Hencken, Kai ;
Year 2015
Title A Novel Vacuum Interrupter Contact Design for Improved High Current Interruption Performance Based on a Double-TMF Arc Control System
Journal IEEE Transactions on Plasma Science
Volume 43
Number 5
Pages / **Article-Number** 1798-1805
Keywords double-TMF contact system, vacuum interrupter contact design, high current interruption performance, double-TMF arc control system, double-transversal magnetic field structure, arc energy distribution, B-field simulation, Lorentz force calculation
A new two-contact system with double-transversal magnetic field (TMF) structure is investigated regarding its potential for high current interruption. It consists of two concentric TMF contacts, in which the inner contact has a disk-shaped structure (spiral contact) and the outer contact a cup-shaped structure. This contact assembly gives several advantages over the use of single-TMF contacts, as the constricted high-current arc might either split between both inner and outer contacts or commute from the inner to the outer contact and continue its rotation. In both scenarios, we expect a better distribution of the arc energy over a larger contact surface. B-field simulation and Lorentz force calculation are carried out to investigate whether two constricted arcs, with one burning on the inner contact and the other on the outer contact, can coexist given their mutual attraction. Single-phase high current interruption tests were carried out to compare the performance of this new double-TMF contact system with that of a standard spiral-type single-TMF one. These tests have revealed superior performance of the new double-TMF contact system, which could interrupt current amplitude at least 20% higher than the one interrupted by the single-TMF contact system.

Publisher Institute of Electrical and Electronics Engineers
ISSN/ISBN 0093-3813
edoc-URL http://edoc.unibas.ch/52677/
Full Text on edoc No;
Digital Object Identifier DOI 10.1109/TPS.2015.2416517
ISI-Number WOS:000354374600019
Document type (ISI) Article