

# Aspects Regarding Controlled Switching of the Vacuum Circuit Breaker

Elvis Boghiu, Adam Maricel, Mihai Andrusca, Alin Dragomir, Adrian Munteanu  
Faculty of Electrical Engineering Department of Electrical Engineering  
“Gheorghe Asachi” Technical University of Iasi Iasi, Romania  
[elvis.boghiu@gmail.com](mailto:elvis.boghiu@gmail.com)

**Abstract**—The paper describes how different parameters from vacuum circuit breaker influence the closing and opening time. Operational voltage, ambient temperature or hydraulic pressure can introduce delays in opening and closing the circuit breaker. These parameters are motorized through sensors that send all the data to a control unit. The control unit calculates the decision/ (time) when to make controlled switching. This paper presents a study case that demonstrates how one of the parameter introduces delays in the opening or closing processes of the circuit breaker.

**Keywords**—vacuum circuit breaker; controlled switching; monitoring; control voltage; ambient temperature; idle time

## REFERENCES

- [1] M. Adam. Mointorizarea și diagnosticarea întrerupătoarelor de putere. Editura “Gh. Asachi” Iași, 2001.
- [2] E. Boghiu. A. Maricel. M. Andrusca. A. Dragomir. A. Munteanu. “Influence of operational voltage on switching time of the circuit breakers,” International Conference on Modern Power Systems (MPS). Cluj. Romania, pp. 1-4, 2017.
- [3] Dong-Kyu Shin. Myung-Jun Choi. Jung-Lok Kwon and Hyun-Kyo Jung. “Analysis of an Electromagnetic Actuator for Circuit Breakers,” Journal of Electrical Engineering & Technology. Vol. 2. No. 3. pp. 346-352. 2007.
- [4] \*\*\*ABB. R-MAG. Vacuum Circuit Breaker with Magnetic Actuator Mechanism.
- [5] \*\*\*EATON. Eaton’s Cooper Power Systems catalog. Medium-voltage vacuum circuit breaker. 2014.
- [6] M. Adam. A. Baraboi. C. Pancu. A. Pleșca. “Aspects Regarding the Controlled Switching of the Circuit Breakers,” International Review of Electrical Engineering. vol. 3 Issue 5. pp. 759-767, 2008.
- [7] M. Stanek. “Analysys of Circuit Breaker Controlled Switching Operations – from Manual to Automatic,” Power Engineering Conference (UPEC). 50th International Universities. Stoke on Trent. UK, 2015.
- [8] M. Adam. A. Baraboi. C. Pancu, “Monitoring and diagnostic system for high voltage circuit breakers”, International Conference on Electromechanical and Power Systems, pp. 55-60, 2007.
- [9] S. Kinoshita. H. Ito. Factory and Field Tests of Controlled Switching in Accordance with IEC62271-302 Standard. Mitsubishi Electric ADVANCE Vol117 03, 2007.
- [10] A. Baraboi. M. Adam. Echipamente electrice. Editura “Gh. Asachi” Iași. 2002.
- [11] E. Boghiu. M. Adam. M. Andrusca. M. Micu. Aspects regarding the controlled switching of the shunt reactors. International Conference and Exposition on Electrical and Power Engineering (EPE). Iasi. Romania, pp. 119-122, 2016.
- [12] M. Andrușcă. M. Adam. R. Pantelimon. A. Baraboi. “About diagnosis of circuit breakers”. 8th International Symposium on Advanced Topics In Electrical Engineering. București. România, pp. 1-4, 2013.
- [13] M Adam, A Baraboi, C Pancu, “About the monitoring and diagnostic of the circuit breakers”, XIIIth International Symposium on High Voltage Engineering, Delft, Netherlands, 2003.