IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, April 2022
Impact Factor: 6.252

Study and Analysis of Different Types of Circuit Breaker

Ms. Mayuri A. Rode[1], Ms. Mayuri V. Jadhav[2], Mr. Bhavesh S. Zade[3], Mr. Pranay M. Kakde[4], Mr. Yash S. Mahajan[5], Dr. U. E. Hiwase[6]
U.G. Students, Department of Electrical Engineering[1,2,3,4,5]
Assistant Professor, Department of Electrical Engineering[6]
Priyadarshini College of Engineering, Nagpur, Maharashtra, India

Abstract: *Circuit breakers play an important role in an electrical system performance in terms of system safety, control, maintenance and cost. In some cases, the conventional mechanical circuit breakers (MCB) may be too slow for the electrical network to operate within the desired safety limits. Besides their other limitations, the MCB also forces the network elements to be rated much higher. The uses of power semiconductor devices to overcome some of their limitations are discussed in this paper. These usages are in terms of solid state circuit breaker (SCB) and hybrid circuit breaker (HCB) concepts. This paper summarizes and reviews the various circuits of SCB and HCB available in the literature. The relevant simulation results for some example circuits have also been presented in this paper. This study will provide a useful framework and point of reference for the future development of HCB and SCB technologies. The breaker can not only open a circuit in response to a current spike, but can also react to a sustained moderate current draw, just above its rated current. Operation of the circuit breaker is simple, but utilizes complex mechanisms. Essentially there are to main internal mechanisms; the trigger and the switch. The trigger is the device that senses the abnormal current load. A sharp spike in current will cause a magnetic field to form in the trigger, releasing the switch. A slightly elevated, but more constant current draw through the breaker will cause the bi-metal composition of the trigger mechanism to deflect in an arc like manner, which is also capable of releasing the switch. The circuit breaker's best point is that the device is effective and compact. The switch can be set to open or closed from the outside of the breaker's case, but can only be set to the tripped position internally, as a results of the trigger mechanism. Once the breaker has been tripped internally, it must be reset externally by switching it off, and then back on. The features enable the breaker to do several jobs at once, eliminating the need for multiple elements in the circuit. For example, it provides the user with an easily assessable on/off switch, fault protection against current spike, and fault protection against heavy current draw. On the other hand it is not 100% effective and must also be manually reset which can be problematic if it is dark and no lights are available with which to see the fuse box. Another bad point is that the circuit breaker has many moving parts, which complicates construction. Simpler or fewer parts might drive cost down and make manufacturing more efficient.*

Keywords: Circuit Breaker, Control, Mechanism, Tripped Position

REFERENCES

[1]. Khaled Alharbi, Ibrahim Habiballah, "Review on Circuit Breakers" International Journal of Engineering Research & Technology (IJERT) http://www.ijert.org ISSN: 2278-0181 IJERTV9IS110133 www.ijert.org Vol. 9 Issue 11, November2020

[2]. Y. Du, J. Deng, H. Lin, H. Zheng, K. Xiang and Y. Shen, "Research and experiment of a current-limiting HVDC circuit breaker," in The Journal of Engineering, vol. 2019, no. 16, pp. 2002-2006, 3 2019, doi: 10.1049/joe.2018.8724.

[3]. C. Li, J. Liang and S. Wang, "Interlink Hybrid DC Circuit Breaker," in IEEE Transactions on Industrial Electronics, vol. 65, no. 11, pp. 8677- 8686, Nov. 2018, doi: 10.1109/TIE.2018.2803778.

[4]. Tim Schultz, Benjamin Hammerich, Lorenz Bort, Christian M. Franck, "Improving interruption performance of mechanical circuit breakers by controlling pre-current-zero wave shape," IET, 2019

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, April 2022
Impact Factor: 6.252

[5]. Edwin Tazelaar, Dick Breteler, Jeroen Van Tongeren, Roel Stijl, "Combining statistics and physics to rank circuit breakers on condition," IET, 2017

[6]. http://www.hyclassproject.com/an-overview-of-mcb-mccb-elcb-rccb-circuitbreakers.htmL