

DC Voltage Variation of Active Power Filter at Breaking Its Load

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1. Introduction

As the usage of semiconductor power conversion equipment has become more widespread, the problem of harmonic current flowing in the electric power system is increasing. The harmonic current is generated by the diode-bridge rectifier using the capacitance-input type rectifier, for example, the causes troubles such as burning of the power line capacitors or malfunction of various control equipment. To counter the harmonic current, an active power filter (abbreviated as AF hereafter) is proposed. AF absorbs the harmonic current component of the load current so that the harmonic current does not flow in the electric power system.

It is well known that the AF causes DC voltage variations when the amount of load to be compensated sudden variation. This variation is considered to be the result of charging and discharging of electrolytic capacitors of the DC circuitry as electric power flows into and out of the AF caused by the residual signal level in the harmonics signal extracting circuit. The DC voltage variation must be estimated beforehand since an extreme DC voltage variation adversely affects the overvoltage applied to the parts used in the AF.

We report the results of investigation on DC voltage variation when the load is shut down.

This is a revision of our report that was issued in the national convention of the Institute of Electrical Engineers of Japan, 1996.

2. DC Voltage Variation for Sudden Variation of Load

3. Calculation of DC Voltage Variation

4. Calculation Result

5. Conclusion

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