

The Vienna rectifier, which is a nongenerative-boost type rectifier, is used in many applications such as telecommunication systems and wind turbine systems. The Vienna rectifier has a special operating requirement. Many switching methods considering this requirement were proposed. These methods generally take into account the Vienna rectifier's operation with the unity power factor because the Vienna rectifier aims to provide the power to the load. However, as the applications for the Vienna rectifier are diversified, control requirements have been suggested, including the dc-link voltage balance control and the novel control under severely unbalanced grids. In this paper, we propose a carrier-based pulse-width modulation (CB-PWM) method for Vienna rectifier operation with a variable power factor. The proposed CB-PWM method adds the compensation voltage to the three-phase reference voltages, depending on the power factor, to maintain the sinusoidal input currents of the Vienna rectifier. The performance and effectiveness of the proposed CB-PWM method are verified by simulation and experiment.