

Development of Voltage Sag Ride-through Capability for the Auxiliary front-end Converter

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Abstract

In recent years, voltage sag has become a very serious problem in industry because critical loads are often interrupted. The conventional diode rectifier often suffers from the reduced grid voltages and the resultant under-voltage alarm on its DC link could interrupt the operation. An auxiliary converter, connected in parallel with the diode rectifier on both the DC side and the AC side, is proposed. The auxiliary converter provides harmonic current compensation by active filter control and regeneration capability, thus the over-all system has the same functionalities as the conventional active front-end converter. The auxiliary converter can accomplish these functionalities with less than 0.5pu capacity compared to the more than 1.0 pu active front-end converter, thus its cost advantage is obvious. In this paper, a voltage sag ride-through solution is proposed for the auxiliary converter. Its controller design is presented, and its dynamic model is also established to evaluate the control design. Laboratory test results are presented to validate the proposed circuit and its performance.

Keyword : voltage sag