An Improved Current Injection Network for ThreePhase High Power Factor Rectifiers that Apply the Third Harmonic Current Injection

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References:


Abstract:

A novel current injection network for low-harmonic rectifiers that apply the third harmonic current injection is proposed in this letter. The current injection network requires one inductor, two capacitors, and one 1 : 1 transformer with voltampere rating of only 0.16% of the input power. The transformer is introduced to provide complete rejection of harmonic components of the injected currents at even triples of the line frequency, resulting in significant reduction of the input current total harmonic distortion (THD). Dependence of the input current THD on the current injection network Q-factor is computed. The THD is shown to be in the range 4%<THD<5.125%. Analytically obtained results are experimentally verified on a 1.5-kW rectifier.

Keywords:
rectifiers., harmonic distortion, power conversion harmonics, converters, AC–DC power conversion