

电力电子与电力传动

电流型高频链AC-AC变换器

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摘要: 提出电流(Boost)型高频链AC-AC变换器电路结构与拓扑族, 它是由输入滤波器、储能电感、输入周波变换器、高频变压器、输出周波变换器和输出滤波器依序级联构成。深入分析研究了这类变换器的原理特性与控制策略, 提出并有效解决变换器启动时储能电感的磁饱和问题及高频变压器漏感引起的电压尖峰现象, 给出这类变换器的仿真和原理试验。研究结果表明, 这类变换器具有电路拓扑简洁、高频电气隔离、双向功率流、变换效率高、网侧功率因数高、负载适应能力强、负载短路时可靠性高等优点。

关键词: AC-AC变换器 高频链 Boost型 周波变换器 移相控制策略

Current Mode AC-AC Converters With High Frequency Link

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Abstract: A circuit configuration and circuit topological family of the current (Boost) mode AC-AC converter with high frequency link are proposed. This kind of circuit topology is constituted of storage inductor, input cycloconverter, high frequency transformer, output cycloconverter, as well as input and output filter. The steady principles and phase-shifting control strategy are deeply investigated, the magnetic saturation of storage inductor in this kind of converter at start-up and the voltage spike of the high frequency transformer' leak inductance are proposed and solved. The simulation and principle verification of the kind of converter are given. The research results have demonstrated that this kind of converter has the advantages such as high frequency electrical isolation, simple topology, two-stage power conversions (LFAC-HFAC-LFAC), bi-directional power flow, high conversion efficiency, high line power factor, strong load adapting ability and high reliability during short circuit in load.

Keywords: AC-AC converter high frequency link Boost mode cycloconverter phase-shifting control strategy

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