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Survey of Electromagnetic and Magnetoelectric Vibration Energy Harvesters for Low Frequency Excitation

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Abstract

The main challenge in the design of vibration energy harvesters is the optimization of energy outcome relative to the applied excitation. This depends strongly on the used energy harvesting principle. Possible principles to generate energy from common existing vibration sources are electromagnetic, magnetoelectric, electrostatic and piezoelectric. At low vibration frequencies, electromagnetic and magnetoelectric energy harvesting techniques deliver energy with the highest efficiencies and are therefore the most promising principles. In this paper, an overview of the recent developments in the state of the art of vibration energy harvesters is presented. Mainly, electromagnetic and magnetoelectric principle are discussed and they have been classified relative to design aspects. Considering delivered energy and depending on the type of vibration excitation, reported converters are compared.

Keywords: Vibration, Energy Harvesting, electromagnetic Converter, Magnetoelectric Converter, Low Frequency Vibration Sources

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