

Abstract

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Conceptual design of a 160 W exhaust based thermoelectric generator for automotive waste heat recovery

The demand for electric power in modern automobiles is increasing rapidly with the integration of new communication, navigation, engine control, and safety systems. Automotive OEMs and researchers are focusing on finding new sustainable sources of electric power onboard automobiles without adding extra loads to the engine. Hybrid vehicles, solar energy panels, and thermoelectric power generations (TEGs) are the main alternatives for providing sustainable, clean sources of electricity for powering modern automobile systems. This paper describes a conceptual design of a new thermoelectric generator based on the waste heat in exhaust gases it can recover electricity from the waste heat in exhaust to supply automotive electrical systems or/and to charge an extra battery. The introduction section of this paper emphasizes the construction and operating principles of thermoelectric generators. A brief literature review is presented next. The third section proposes the conceptual design of the 160 Watt TEG. A general description of the concept is presented first, and then the concept of the hot-side heat exchanger is explained, followed by the cold-side heat exchanger. Finally a conclusion is conducted after a brief discussion for the mechanical assembly of the TEG.