Developments of Brushless-Rotary Mini-Pump

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ABSTRACT

The goal of this research is to develop a brushless-rotary mini-pump, the mini-pump would be used as the source of hydraulic pressure system in the future, such as the liquid cooling system. In the cooling system, the coolant pushed by mini-pump to carry away the thermal energy of system operating. This mini-pump and pipes is connected by series directly and will save the space, time of combination and materials. In the future, this work will be applied in cooling system of notebook, LED lamp, auto sprinkler, fuel cell, man-made apparatus and so on. Due to the developing trend of mechanism miniaturization and efficiency maximization, such as notebook, the reduction of cooling air will cause the temperature of systems higher. Therefore, it must to solve urgently in the future. The present liquid cooling system is the best of all kinds of cooling system in the market. But the most systems are expensive, heavy and noisy. Hence, this project is to design a high efficiency, low noise and long life time mini-pump that provide source of liquid cooling system. The new pump will lead system to perform higher efficiency and carry higher loading. In this research, the theory of electromagnetics and finite element method will be adopted to design, simulate, and analyze the new product. Also, magnetic forces and magnetic field simulation, parameters of design will be discussed and optimized by experiments. The CAE commercial software, such as ANSYS, will be used for structural design, and will reduce a lot of time of developments. Meanwhile, CAE technologies and commercial software will be led in to promote designing abilities of cooperative manufacturer and help the manufacturer enter the relative market.

Keywords : Brushless ; Pump ; Finite element method

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