A Study and Design on Fuzzy Control Application to Energy-Saving of the Cooling System

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ABSTRACT

Nowadays refrigeration equipment, including refrigerators, cold storage machines, and air conditioners, etc, has been extensively applied on people's livelihood and industry, brings much comfort for people and promotes of the products quality. But all the refrigeration equipment is high-electricity-consuming, and its requirements for electric power will be enhanced. In view of this, in order to ameliorate the efficiency of this kind of system, this research proposes refrigeration equipment cooling system controlled by the Fuzzy Theory to adjust the removing heat capacity of the cooling system virtually for the purpose of saving energy. Therefore, the purpose of this study design is to explore how to save energy with the cooling system of the refrigeration equipment. Based on the cooling water temperature at the entrance of the condenser, the main approach adopts Fuzzy Theory and uses the Programmable Logical Controller (PLC) to drive the inverter for changing the rotational speed of the cooling water pump and the cooling tower. According to the actual condition of the load operation in order to make the cooling system adjust the removing heat capacity of the cooling system. In order to save the energy, we can improve the fast-pace problem from the cooling water pump and the cooling tower of the traditional cooling system. The experiment mentioned in this article intends to improve the cooling system we already have. After the actual experiment, under the operation at the intermediate-high speed (frequency 57Hz), this cooling system can save 10% of the energy at least.

Keywords : Cooling System ; Fuzzy Theory ; Programmable Logical Controller