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电机与电器

新型三绕组并联式高效单相感应电动机稳态性能

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摘要：

提出一种新型的三绕组高效单相感应电动机，其定子上有3个绕组，与2个外接电容连接，采用单相交流电源供电，3个绕组所在的支路之间为并联关系。通过电容的适当选择，可使该电机在额定运行时3个绕组的电流接近对称。基于合成电流法，对该接法电机的对称运行条件进行分析，得出了电容的确定方法；提出了该电机稳态性能计算的具体方法；设计了一台样机，并进行了试验研究。结果表明，该新型电动机在额定负载下运行时，具有与同容量三相感应电动机相近的效率和更高的功率因数。

关键词： 三绕组并联式 单相感应电动机 合成电流法 稳态性能计算 单相供电

Steady-state Performances of a Novel Energy-efficient Single-phase Induction Motor With Three Parallel-connected Windings

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Abstract:

In this study, a novel energy-efficient single-phase induction motor with three-phase stator windings which were connected to two external capacitors in parallelly, supplied by the single-phase AC power, had been presented. By selecting the appropriate capacitors, the three-phase currents of the proposed motor would be approximate symmetric under steady-state operation. First of all, based on the method of synthetic current, the condition for balanced operation was analyzed and the method for determining the requested capacitances was also obtained. Then, the approach for calculating the steady-state performance was brought out. Finally, a prototype was designed, based on which, detailed experimental researches were carried out. It is concluded that, compared with three-phase induction motors of the same capacity, the novel single-phase induction motor has nearly the same efficiency when operating at rated load but with a higher power factor.

Keywords: three parallel-connected windings single-phase induction motor method of synthetic current steady-state performance caculation single-phase supply

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