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传递现象

空气源热泵热水系统即刻加热模式和循环加热模式的对比

裴刚, 李桂强, 季杰, 符慧德, 王佳音

中国科学技术大学热科学和能源工程系

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摘要

建立了空气源热泵在即刻加热（即热）模式和循环加热（循环）模式下制取热水的对比试验台，并对两种模式制取热水的运行性能作了对比研究。在环境温度为(19±0.5)℃条件下，分别将176 kg热水从初温20℃加热至55℃，即热模式平均COP比循环模式高出24%，同时冷凝加热功率也提高了约20%。结果表明，即热模式不仅具有更高的COP，还具有更高的冷凝加热功率，节约了电能消耗，缩短了加热时间。同时即热模式下冷凝压力、压缩比、压缩机最高出口温度等重要参数都要优于循环模式。显示出了空气源热泵热水系统在即热模式下具有更优越的热泵性能。

关键词

即刻加热 循环加热 空气源热泵 对比试验 COP

分类号

Comparative study on instantaneous heating and circulation heating modes of ASHPWH

PEI Gang,LI Guiqiang,JI Jie,FU Huide,WANG Jiayin

Abstract

A comparative experiment prototype of an air-source heat pump water heater（ASHPWH）system was established for the comparative study of instantaneous heating and circulation heating modes. At ambient temperature of (19±0.5)℃，176 kg of water was heated from 20℃ to 55℃ with the two modes respectively. The average COP of the instantaneous heating mode is 24% higher than that of the circulation heating mode，and the average condensation heating power is also increased by 20%. The instantaneous heating mode not only has a higher COP，but also has a higher condensation heating power，resulting in a lower power consumption and a shorter heating time. At the same time，the condensation pressure，the compression ratio，the maximum outlet temperature of the compressor and other important parameters with the instantaneous heating mode are superior to those with the circulation heating mode. The present study shows that ASHPWH system has superior thermal performance in the instantaneous heating mode than in the circulation heating mode.

Key words

instantaneous heating circulation heating ASHP contrast experiment COP

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通讯作者 裴刚 peigang@ustc.edu.cn