

Accepted Manuscript

Power Management Strategy for a Parallel Hybrid-power Gas Engine Heat Pump System

Xiaoming Wan, Liang Cai, Jie Yan, Xiaofan Ma, Tao Chen, Xiaosong Zhang

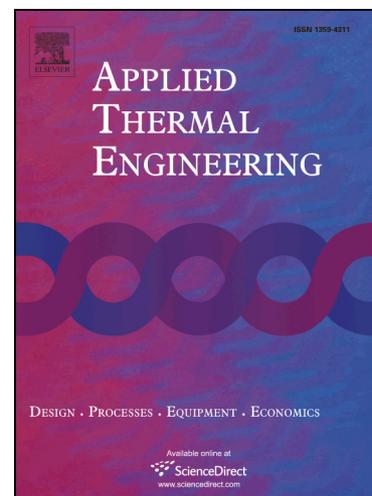
PII: S1359-4311(16)31268-6
DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2016.07.138>
Reference: ATE 8736

To appear in: *Applied Thermal Engineering*

Received Date: 1 April 2016
Revised Date: 7 June 2016
Accepted Date: 19 July 2016

Please cite this article as: X. Wan, L. Cai, J. Yan, X. Ma, T. Chen, X. Zhang, Power Management Strategy for a Parallel Hybrid-power Gas Engine Heat Pump System, *Applied Thermal Engineering* (2016), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2016.07.138>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Power Management Strategy for a Parallel Hybrid-power Gas Engine Heat Pump System

Xiaoming Wan, Liang Cai*, Jie Yan, Xiaofan Ma, Tao Chen, Xiaosong Zhang

Air Conditioning and Refrigeration Laboratory, School of Energy and Environment, Southeast
University, 2 Sipailou Street, Xuanwu District, Nanjing, 210096, China

*Corresponding author. Tel.: +86 13951907157; E-mail address: cailiang@seu.edu.cn

Abstract:

Hybrid-power gas engine heat pump (HPGHP) system is a novel air conditioning system, which has two power sources, the gas engine and dual-use motor respectively. Based on the experimental tests on HPGHP system, the key components models of the system has been established in this paper. In order to keep the gas engine always running with high thermal efficiency and reducing the gas consumption, a preliminary rule-based control strategy is first described in the paper to distribute the power sources. Then, for obtaining better fuel economy, the equivalent gas consumption minimization mathematical models and power balance principle are established. At last, the equivalent gas consumption minimization strategy is put forward and the torque curves of the engine and motor are optimized under different operating modes, to minimize the equivalent gas consumption. The results show that the gas engine can always run in economical zone with high thermal efficiency above 0.25 in different working modes; The gas consumed rate reaches the minimum value of 284.62 g/(kWh), 286.93 g/(kWh), 296.6 g/(kWh) in mode C, mode D and mode L, when the compressor speed are 950 rpm, 1450 rpm, 2150 rpm, respectively; The average PER of HPGHP system are 0.894, 0.969, 1.049 in mode C, mode D and mode L, respectively.

Keywords: Power management; HPGHP; Equivalent gas consumption; Fuel economy

Download English Version:

<https://daneshyari.com/en/article/4992011>

Download Persian Version:

<https://daneshyari.com/article/4992011>

[Daneshyari.com](https://daneshyari.com)