

ICR0005

Research on Exhaust Heat Utilization System for Packaged Type Gas-Engine Driven Heat Pump

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Abstract

With the background of energy saving system and environmental attributes, gas engine driven heat pump is growing in popularity in Japan. GHP has created a firm position in the medium to small scale of commercial space for cooling and heating market in particular. On the other hand, even greater efficiency is being demanded in order to cope with global environmental problems and energy issues. As for GHP, in addition to more highly efficient devices such as engines and compressors, exhaust heat re-use is an effective method to improve efficiency.

We research a new system for utilizing the exhaust heat from gas engine to provide comfortable air conditioning (Dehumidification Air conditioning) in cooling operation and to improve COP in heating operation. The new system is a kind of a packaged type system, whose indoor unit is equipped with a refrigerant heat exchanger and a hot water heat exchanger located at the downstream of the refrigerant heat exchanger. With the effect of the hot water heat exchanger, re-heat dehumidification operation can be performed. In heating operation, to provide exhaust heat from the engine to indoor unit improves COP.

Simulation and experiment prove that high efficient dehumidification operation is possible by using exhaust heat. In addition, COP in heating operation can attain 1.6 , while that of conventional GHP is 1.1.