TECHNOLOGY

Heating Performance Improvement of Heatpump System

OVERVIEW

As cars continue to become more electrified in hybrid, electric, and plug-in hybrid vehicles, the automobile industry is facing a heat source shortage for cabin heating and air-conditioning systems. In conventional cars, the industry has been able to utilize the waste heat from the internal combustion engine in order to keep passengers and components in those cars warm. Two heating and dehumidifying backups are currently being used. One is a vapor injection technique 2 stage compression and expansion cycle heat pump, but heating capacity is still not enough in colder conditions. Another is the use of an electric heater, but the low coefficient of performance (COP) of less than 1 results in reduced driving range of battery-powered vehicles significantly.

Researchers at the University of Maryland have developed prototype thermoelectric (TE) modules which, when integrated into a vapor injection heat pump system, increase the heating capacity the of the HVAC system, especially in cold climate with a higher efficiency than existing techniques. The invented system dissipates heat into the cabin by both absorbing heat at the evaporator and by turning compressor power input into heat. The COP of the TE is always greater than that of the conventional electric heater, increasing the efficiency of the whole heat pump system. Additionally, the dehumidification, or defrost capacity, can be controlled simply by changing the supply current for the TE heat exchanger.

Applications:
· Electric and hybrid automobile HVAC systems
· Residential air-conditioning systems
· Domestic hot water heater systems

Advantages:
· Increases the efficiency of current automobile HVAC system
· Eliminates the need for battery backup heat, extending range of the vehicle

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Additional Information

INSTITUTION

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PATENT STATUS

Patent(s) pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Industrial Processing

EXTERNAL RESOURCES

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