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Title: Direct combustion test solar air conditioner

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What is solar PV driven air conditioner?

The design of direct solar PV driven air conditioner based on stand-alone solar PV system is studied. The air conditioner is driven directly by solar PV module through an inverter. No grid power is connected. In order to balance the solar PV power and load power and reduce the cost, a small buffer battery is installed.

What is solar air conditioning system?

Solar air conditioning system developed in the present study is based on the concept of direct solar driven. Battery acts only as buffer energy storage for balance of solar and load power, and smooth operation of compressor under variable solar radiation.

How do solar air conditioners work?

An inverter is used to convert PV power into ac power to drive the air conditioner. The battery can supply power for less than 1 h during low solar radiation periods. Hence, the cooling system may suffer from loss of power. In the present study, six solar air conditioners are designed and tested.

What is the operation probability and runtime fraction of solar air conditioner?

The operation probability (OPB) and runtime fraction RF of solar air conditioner represents the risk of power loss in a stand-alone solar system. Lower risk may require higher investment on larger solar system and battery storage. There exists an optimization which needs further studies.

Can solar air conditioner design be applied to electric vehicles?

If the present solar air conditioner design is applied to electric vehicles, energy consumption, weight, space, and cost of solar PV system need to be considered. The design to reach high OPB and RF will be the major concern in electric vehicle. Hence, the design with $rpL = 2$ for $OPB = 0.8$ at solar irradiation $IT = 400 \text{ Wm}^{-2}$ may be proper.

What is a stand-alone solar cooling system?

In these solar cooling systems, the power grid will supply electricity for cooling when solar energy is not available. In off-grid applications, solar air conditioner needs to be powered by stand-alone PV system. The design of stand-alone solar cooling system is complicated in view of possible loss of power during low solar radiation periods.

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The conventional automotive air conditioning system was driven by internal combustion engine or power battery, which increased the oil consumption and vehicle carbon ...

It is consistently demonstrated by various test groups that the air flow rate, temperature, humidity, and perhaps, pressure entering the combustion process, must be ...

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