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Solar Energy South Africa

Energy storage chiller control system

Overview

Can solar cooling systems be controlled with absorption chillers?

Discussed various control strategies of solar cooling systems with absorption chillers. Solar cooling technology is a potential solution for air conditioning and thermal comfort in buildings. However, the intermittent nature of solar energy is a significant challenge for the widespread adoption of this technology.

What is cold storage in a chiller?

The stored cool energy can be discharged to cover the cooling requirement of a building. Depending on the type of chiller in terms of working fluid pairs, the cold storage can be either sensible (cold water) or latent heat in the form of ice or low-temperature PCMs.

How does an absorption chiller work?

Here, the absorption chiller is connected directly to the solar thermal collector that provides the required heat energy to operate the chiller. The chiller produces a cooling effect during sunshine hours and charges the cold storage. The stored cool energy can be discharged to cover the cooling requirement of a building.

What is the objective function of a chiller?

The objective function is the lowest energy consumption during the optimization period. Optimization is carried out under constraints such as cold storage and release flow rate, cold storage tank volume, 15 min emergency cold storage capacity, and the continuous operating time of the chiller.

Can solar energy be stored in a chiller?

While cold energy can be stored when excess solar energy leads to extra generation of cold energy from the chiller. The stored cold energy can be discharged to cover part of the cooling demand. Both cold and hot storage can be in the form of sensible or latent heat.

What is temperature control in a chiller?

This strategy allows the chiller to operate at maximum efficiency by maintaining the temperature of collectors within a specific range. Temperature control, in which the cooling output of an absorption chiller is adjusted by controlling the temperature of the chilled water leaving the chiller.

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Review on Advanced Storage Control Applied to ...

Bürger et al. designed a one-day experiment to successfully implement a mixed-integer nonlinear MPC with the aim of economic optimization to control the operation of a solar-driven climate system, which consists of two ...

Battery Energy Storage System Cooling Solutions

Without thermal management, batteries and other energy storage system components may overheat and eventually malfunction. This whitepaper from Kooltronic explains how closed-loop enclosure cooling can improve the power ...

A model predictive control for a multi-chiller system in data ...

In the operation control technology of data center cooling systems, the control objectives should simultaneously consider reducing system operation energy consumption and stabilizing server ...

Model Predictive Control of Thermal Energy Storage in Building Cooling ...

more challenging to control than conventional

systems [1], [2], [15], [14], [6]. For a wide range of innovative heating and cooling systems, their enhanced efficiency depends on the active ...

[Designing TES System: Satisfying the ...]

The design must also take into account two scenarios: partial storage and full storage thermal energy. In other words, cooling/heatingenergy can be required during a limited number of hours per day by only using thermal energy storage ...

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