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Solar Power Generation System Dynamics

Overview

Photovoltaic (PV) power generation has developed very rapidly worldwide in the recent years. There is a possibility that the PV power generation will switch from an auxiliary power supply, as of today, to a main.

What is dynamic modelling and integration of solar PV and wind power systems?

The present paper describes the dynamic modelling and integration of solar PV and wind power generation systems in the time-domain simulation of power systems. The developed models are based on the notion that the dynamics of the converter perform the main role in the interaction of the renewable generators with the rest of the power system.

Do solar photovoltaic and wind power generation systems need a transient stability analysis toolbox?

Hence, it is essential to analyse the necessary adjustments in operation strategies in preparation for increased amounts of variable generation in existing power systems. The present study describes the dynamic modelling and integration of solar photovoltaic and wind power generation systems into a transient stability analysis toolbox.

Do PV generators need a dynamic simulation model?

To achieve such goals, it is essential to build credible simulation models for PV generators (Villegas Pico and Johnson, 2019). Like all the other dynamic components, such as generators or motors, a PV generator needs to be modeled dynamically for the purpose of power system dynamic simulation.

What is a solar power system?

The electric power generation system is represented by the “Solar Power” block in the figure. Each PV cell is a basic element of this block, which is modeled by its current and voltage characteristics (Jedari and Hamid Fathi, 2017).

How is a PV generator modeled in a power system steady state study?

A PV generator is modeled as a constant active power and reactive power source in power system steady state studies. When PV generation changes due to the ambient environment, the power system steady state studies do not investigate the transients of the power system caused by the change in PV generation.

What is a dynamic PV system model?

Two specific dynamic models are included in the scope of this document. The first, a Central Station PV System model, is intended to capture the most important dynamic characteristics of large scale (> 10 MW) PV systems with a central Point of Interconnection (POI) at the transmission level.

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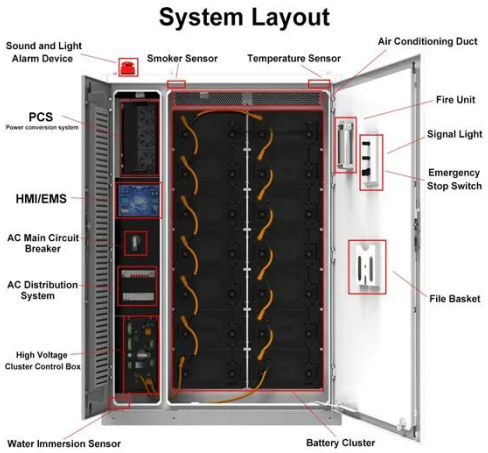

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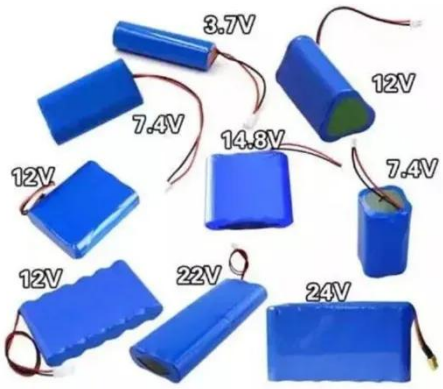

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