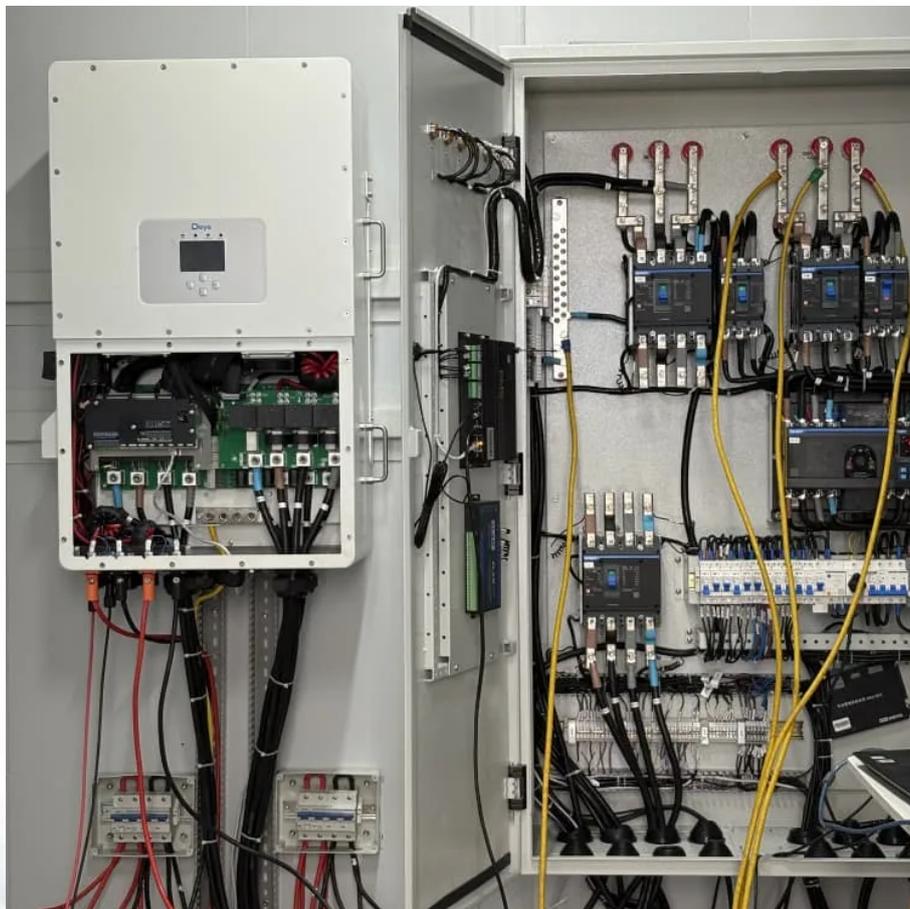


# **Solar inverter control integrated machine connected to energy storage**





## Overview

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How does a grid inverter work?

The grid inverter functions in two modes: as a front-end rectifier when transferring power from the grid to the battery, and as a voltage source inverter when feeding power from the PV/battery back to the grid. It incorporates a full-bridge PWM inverter with an LC output filter to inject synchronized sinusoidal current into the grid.

How do mg inverters work?

Notably, it excels in adapting to rapid load changes, maintaining active power at the specified reference while dynamically adjusting reactive power for voltage stability, which is ideal for MGs with dynamic load profiles. The inverters' reference output voltages ( $V_{ref}$ ) are determined using a power flow analysis on the system.

How does an inverter control injected reactive power?

The control mechanism now entails adjusting the injected reactive power to align with these reference values. Consequently, the inverter regulates the output reactive power to meet the specified voltage reference ( $V_{ref}$ ).

How much power does an inverter use?

Here, both inverters are set to an active power reference of 30 kW and a reactive power reference of 5 kVAR. Note that the initial battery charge levels are set to 80% for the first and 50% for the second battery to allow evaluation of the inverter's capability to disconnect a battery as it approaches its lower SoC limit.



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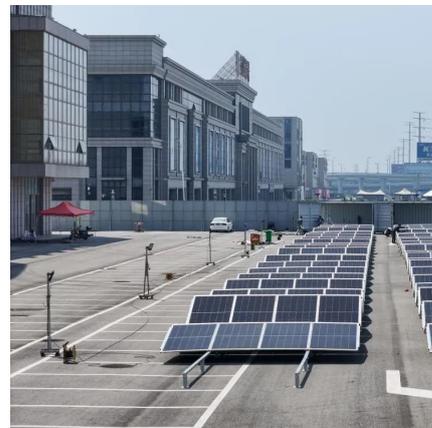
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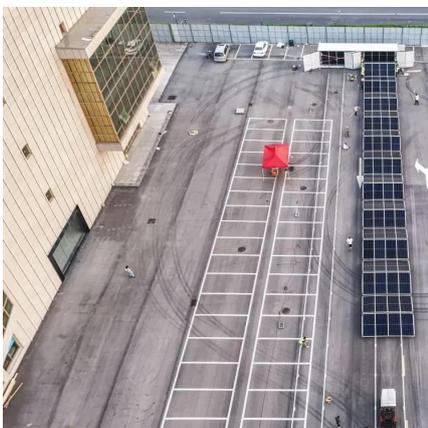
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