

## SolarTech Power Solutions

# Battery inverter current limiting control



## Overview

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Why do inverters need a current limiter?

Without proper safeguards, excessive currents during disturbances can damage the inverter's power stage, leading to system failures and jeopardizing grid stability. Addressing this challenge is where current limiters come into play. Current limiters are the first line of defense during grid disturbances.

How to limit inverter output currents?

A well-established method to limit the inverter output currents is curtailing the reference signal feeding into the current controller.

What is a current limiter in a GFM inverter?

These devices regulate the flow of electrical current, ensuring it remains within safe operational limits. There are three main approaches to current limiting in GFM inverters: direct, indirect, and hybrid methods. These current limiters can be implemented at different stages, as shown in Fig. 2.

How does current limiting affect inverter dynamic behavior?

The altered inverter dynamic behavior resulting from current limiting can affect the system. For instance, the change in inverter output terminal behaviors can translate to network-wide attributes, such as power system protection, transient stability, voltage support, and grid synchronization.

How does a current limiter affect the output impedance of an inverter?

During overcurrent conditions, on the other hand, the inverter output impedance cannot remain the same. As the output current of the inverter is curtailed by a current limiter (independent of the limiter type) the equivalent output impedance of the inverter modulates as a function of fault severity and other conditions .

How can a limiting current limit a grid-side current?

of current-limiting can limit the grid-side current of the in-verter to  $I_{max}$  with a phase angle of  $\phi$ . Note that  $\phi$  regulating the output current angle requires knowledge of the grid voltage, which can necessitate the use of a PLL to track the grid voltage  $v_g$ .

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