

## SolarTech Power Solutions

# Inverter parallel high-frequency circulating current



## Overview

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What are the types of circulating current in parallel inverters?

There are two types of circulating current in parallel inverters: low-frequency and high-frequency circulating current. The low-frequency circulating current is parameter related, such as imperfect symmetry in hardware and dependent control of parallel inverter dead time [18, 19].

What if the number of inverters operating in parallel exceeds 2?

However, if the number of inverters operating in parallel exceeds two, the design method proposed in this paper will face technical challenges; for example, the circulating current paths between multiple inverters are significantly complex, making it difficult to ensure that the circulating currents remain stable.

How circulating current flows between inverters?

The circulating current flows between the inverters when the reference voltages differ according to the dead time, imperfect symmetry in hardware, and dependent control of parallel inverters. Different zero-sequence voltages  $V_{zsv1}$  and  $V_{zsv2}$  are injected into each module based on the discrepancy of the reference voltages from Eq. (10).

What causes circulating current in a parallel inverter?

The circulating current is generated by differences in each inverter, such as hardware parameters and control process. The circulating current deteriorates the output current quality and degrades the reliability of the parallel system [12-15].

Why do parallel inverters reduce circulating current?

The common mode voltage of each inverter is distributed more equally in a carrier cycle, and thus the circulating currents of paralleled modules are mitigated. Furthermore, the reduction methods for low-frequency circulating

current can be divided into two categories based on control and modulation [40–67].

Does circulating current suppression improve reliability and redundancy of parallel inverter systems?

Multiple requests from the same IP address are counted as one view. Circulating current suppression can effectively improve the reliability and redundancy of parallel inverter systems. The mechanism and influencing factors of the low- and high-frequency zero-sequence circulating current (ZSCC) are analyzed in this study.

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