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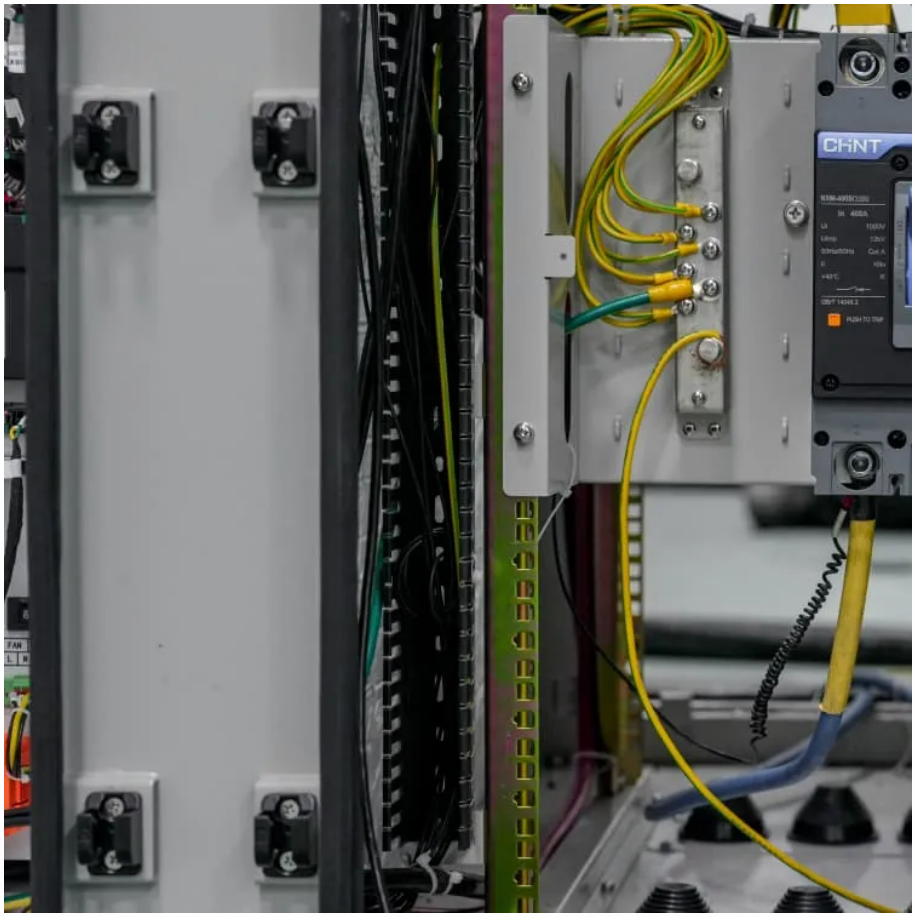
Three-phase inverter delay



Overview

Can a three-phase inverter deteriorate the performance of the system?

This delay can deteriorate the performance of the system if not considered in the design of the controller. In this paper, the problem is described, and the solution to this issue is clearly explained using a three-phase inverter as an example. Experimental results to validate this solution are shown.

How to compensate for dead-time effects in three-phase grid-tied inverters?

To compensate for the dead-time effects in three-phase grid-tied inverters, this paper proposes a Linear Quadratic Gaussian (LQG) multivariable control approach. The LQG multivariable control is known as a robust control approach while provides a high band-width for the closed-loop system.

Is the three-phase grid-tied inverter a second-order system?

The derived nominal model for the three-phase grid-tied inverter shows that the three-phase grid-tied inverter in the synchronous reference frame is a second-order system. However, the proposed LQG control combined with the two augmented integrators form a sixth-order system.

What happens if a three-phase grid-tied inverter has low-order harmonics?

For a three-phase grid-tied inverter in the synchronous reference frame, low-order harmonics in the injected currents to grid result in disturbances in \ (I_ {d}\) and \ (I_ {q}\). As stated before, the inverter’s dead-time introduces the 5th, 7th, 11th, 13th, 17th, 19th. harmonics at the inverter’s output voltage.

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