

Bus current is small but phase current is large



Summary of Content

The DC bus current can appear small while the motor phase current is large because the inverter and motor inductance store and release energy, causing phase currents to peak locally while the average bus current remains lower.

Understanding Bus vs. Phase Current

Bus current represents the total current flowing through the DC link of the inverter, essentially the current drawn from the power supply. Phase current is the current flowing through each motor winding, which is what the motor actually uses to generate torque and is regulated by the controller (e.g., FOC or torque control). In PWM-controlled inverters, the phase current can have high peaks due to the switching of transistors, while the bus current is an average over the DC link. The bus current is influenced by the total energy drawn from the supply, which is smoothed by the DC link capacitors, whereas the phase current reflects instantaneous energy delivered to the motor windings.

Role of Inductance and Switching

Motors are inductive loads, meaning the current through the windings cannot change instantaneously. During the ON phase of a transistor, the inductor stores energy, and during the OFF phase, the current recirculates through diodes or other paths. This results in phase currents that can be much higher than the average bus current, even though the total energy is conserved. Essentially, the inverter acts like a step-down DC/DC converter, where the product of bus voltage and bus current equals the product of phase voltage and phase current, ignoring losses.

Article Content

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Phase current VS Battery current...

, Set the current phase to 260A (2.6 X). Now I have a 200A Kelly (phase), but why if i have max output of Phase 200A,

Review of the calculation of DC-link capacitor current

This work also discusses the calculation of the multi-level converter's DC-link capacitor

Current Sensing Techniques in Motor Control Applications

By applying 1st Kirchhoff's law, the DC Bus current is equal to the current of the phase, which has an opposite direction than the

ECEN 615_Lecture 3

Three-Phase Per Unit Example Solve for the current, load voltage and load power in the previous circuit, assuming a 3f power base

What is the relationship between Motor Phase Current and Motor

Typically, assuming balanced phase currents (which they almost always are), you can directly take the RMS three-phase current as

Understanding why the motor phase current is different than the power ...

To understand why the current of the power supply is different from the motor phase current first, it is necessary to understand how

Balanced Faults in Power Systems: Three-Phase Fault Analysis

Learn about balanced three-phase faults, fault current calculations, and short-circuit capacity in power systems. Includes examples

The difference between the motor current and phase current

The “motor current” is the amplitude of the motor phase currents while the “phase current” represents the current measured on each

Bus vs Phase vs Line Voltage in Robot Motors Explained

Understand bus voltage, phase voltage, and line voltage in robot joint motors. Learn the critical relationships that

Theoretical and simulation analysis of DC bus current fluctuation ...

ABSTRACT Modular Multilevel Converters (MMCs) play a crucial role in high-voltage DC (HVDC) systems due to their adaptable

Line Voltage to Phase Voltage Line Current to Phase Current ...

At the same time the line current or phase current above 25Amps, Current transformer is used to reduce the current level from high

Input current vs phase current

Unfortunately I really don't have room to add a large battery pack. This was a major issue I notice in the early Electric

Help. What is the relationship between the phase current and the bus ...

The relationship between phase current and bus current, as well as the relationship between phase voltage and bus voltage, in a

A COST-EFFECTIVE BUS-CURRENT DETECTION TECHNIQUE FOR CURRENT

This paper investigates a simple and cost-effective phase current measurement technique for a three-phase switched reluctance

AMPS Phase vs. AMPS Peak | News | Lin Engineering

Step Motor Terminology got you stumped? Lin Engineering explains the differences between Amps/Phase and Amps

Theoretical and simulation analysis of DC bus current fluctuation ...

For the current study, there is also the problem of asymmetry of the DC component in the three-phase circulating current, so in future

Busbar Sizing by Current & Temperature Rise

Busbar sizing by current & temperature rise: copper & aluminium ampacity tables, derating

High Resolution, Small Form Factor Phase Current Sense for 48V

The AMC0106Mxx devices enable the design of an accurate and reliable, shunt-based current-sensing subsystem for three-phase

DC-Bus Ripple Current Characterization of Three-Phase 2/3L-VSIs ...

With such a characterization, the dc-bus capacitor ripple current dependent on temperature of 2/3L-VSIs given in (1) can be

Busbar

In addition, thermal expansion from temperature changes induced by ohmic heating and ambient temperature variations, and

CHAPTER 2

A balanced system is one in which the line and phase currents and voltages in all three phases are equal in magnitude and

Key Details of Electronic Speed Controllers

In the article below, Hargrave Technologies discusses the details around its electronic speed controllers (ESC), covering the

Phase & Bus Current Sensing for Motor Drives

DC bus current and phase currents are present at different points along this path. Bus current represents total power through the DC

Current Transformer Basics and the Current Transformer

Bar-type Current Transformer – This type of current transformer uses the actual cable or bus-bar of the main circuit

Three-phase power flow calculations using direct ZBUS method for large ...

In this study, a three-phase power flow solution method using graph theory, injection current, and sparse matrix

Power Flow

This assumption holds relatively well for high voltage transmission systems, but begins to break down at smaller

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For more information, pricing, or custom solutions, please contact us:

Website: <https://madibabayelectrical.co.za>

Email: sales@madibabayelectrical.co.za

Phone: +27 63 947 2185

Address: 15 Fredman Drive, Sandton, Johannesburg, 2196, South Africa

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