EIEI POWER

Motor control with flywheel energy storage

Overview

How does a flywheel energy storage system work?

Based on the aforementioned research, this paper proposes a novel electric suspension flywheel energy storage system equipped with zero flux coils and permanent magnets. The newly developed flywheel energy storage system operates at high speeds with self-stability without requiring active control.

Why is Sensorless control technology preferred in flywheel energy storage system?

Therefore, sensorless control technology is preferred. Furthermore, the PMSM is the core of energy exchange in the flywheel energy storage system, and the accuracy and speed of the motor control strategy determine the overall charging and discharging control performance of the system.

What is the grid-side control strategy of the flywheel energy storage system?

Block diagram of the machine-side charge and discharge control of the flywheel energy storage system. The grid-side control strategy of the flywheel energy storage system combines grid voltage-oriented vector control and SVPWM (Space Vector Pulse Width Modulation) technology.

What is the difference between SMO and Flywheel energy storage systems?

Most current research on SMO algorithms primarily focuses on motor control 30, whereas flywheel energy storage systems exhibit a more complex back-to-back structure, high operational speeds of the flywheel and motor, large system inertia, fast charging and discharging rates, and frequent switching of control strategies 31, 32.

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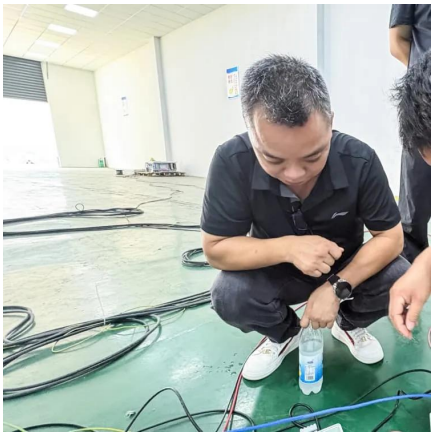
[Control strategy of MW flywheel energy storage system ...]

Nov 1, 2022 · This study analyzes the basic requirements of wind power frequency modulation, establishes the basic model of the flywheel energy storage system, adopts a six-phase ...



Introduction to motors and controllers of flywheel energy storage ...

The paper covers the principle and characteristics of permanent magnet brushless DC motors, permanent magnet synchronous motors, induction motors and switched reluctance motors, ...

Sensorless fault-tolerant control strategy of flywheel energy storage

Oct 10, 2025 · Flywheel energy storage systems (FESS) are crucial for efficient energy storage in power systems. However, the sensorless control strategy for flywheel motors can experience ...

[Research on Energy Storage Flywheel Motor Drive Control ...]

Apr 3, 2024 · A new control strategy for a wind generation and flywheel energy storage combined system was proposed. A mathematical model of the system was built based on a vector ...

[Research on Energy Storage Flywheel Motor Drive Control ...]

Apr 3, 2024 · This paper will focus on the composition and operation principle of flywheel energy storage system, the classification of drive control strategy, charging control strategy, discharge ...

[Research on Energy Storage Flywheel Motor ...]

Apr 3, 2024 · A new control strategy for a wind generation and flywheel energy storage combined system was proposed. A mathematical model ...

Design of an improved adaptive sliding mode observer for ...

Apr 28, 2025 · Accordingly, an improved adaptive sliding mode observer algorithm for the charging and discharging control of the flywheel energy storage system is proposed.

[Control Method of High-power Flywheel Energy Storage ...]

Feb 29, 2024 · The flywheel energy storage converts electrical energy into mechanical energy in the process of charging, while the discharge converts mechanical energy into electrical energy ...

Design and Research of a New Type of Flywheel Energy Storage ...

Feb 18, 2025 · This article proposes a novel flywheel energy storage system incorporating permanent magnets, an electric motor, and a zero-flux coil. The permanent magnet is utilized ...

Magnetic Levitation Flywheel Energy Storage System With Motor-Flywheel

Feb 13, 2025 · This article proposed a compact and highly efficient flywheel energy storage system (FESS). Single coreless stator and double rotor structures are used to eliminate the ...

Operation Control Strategies for Switched Reluctance Motor ...

Dec 18, 2022 · In this paper, the mechanical characteristics, charging/discharging control strategies of switched reluctance motor driven large-inertia flywheel energy storage system ...

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