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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 21209-2025

Replacing GB/T 21209-2017

**AC electrical machines used in power drive systems -
Application guide
(English Translation)**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document replaces GB/T 21209-2017 "Guidelines for the application of AC motors for power transmission systems" and GB/T 21209-Compared with 2017, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- Changed the terminology and definition of common mode voltage (see 3.3, 3.3 of the 2017 edition);
- Added the terms and definitions of resonance frequency band, general variable frequency motor and special variable frequency motor (see 3.13, 3.18 and 3.19);
- Added the description of the minimum safe speed of sliding bearings (see 4.3.5);
- Increased cable length and electrical stress, impulse voltage insulation level and electrical stress, and low voltage and medium and high voltage motor insulation system capabilities Description (see 7.2, 7.3, 7.4);
- Added a description of the high-frequency effect of the inverter (see 8.1.4);
- Added content on the generation and hazards of high-frequency bearing currents (see 8.2, 8.3);
- Added methods to weaken high-frequency common-mode current (see 8.4.1, 8.4.2) and expanded Table 6;
- Added requirements for inverter-compatible motors (18.1, 18.2.2, 18.2.3, 18.3, 18.5.2, 18.6, 18.7, 18.8, 18.9, 18.10, 18.11, 18.12, 18.13).

This document is equivalent to IEC TS60034-25:2022 "Rotating electrical machines - Part 25: Alternating current for use in power transmission systems" the document type was adjusted from IEC technical specifications to my country's national standards.

The following minimal editorial changes have been made to this document.

--- Taking into account my country's standard system, the name of the standard will be changed to "Application Guidelines for AC Motors for Electric Power Drive Systems".

Introduction

The performance characteristics and operating parameters of the motor powered by the inverter are affected by the entire transmission system, including the power supply system, inverter, the wiring cables, motors, mechanical shafting and control devices are all technically diverse.

The values are for reference only.

The design of electric drive system involves some important parameters.

It is beyond the scope and purpose of this document to specify values or limits for all parameters.

In practice, electric drive systems are largely composed of components produced by different manufacturers. The purpose of this document is to it is possible to illustrate the impact of these components on the motor design and its performance characteristics.

This document covers AC motors designed specifically for use with frequency converters (dedicated frequency converter motors), as well as those originally designed as specified in IEC 60034-12.

It is designed to be used for variable frequency motors (general variable frequency motors) that are directly powered by the power grid.

Application Guidelines for AC Motors Used in Electric Drive Systems

1 Scope

This document describes the performance characteristics of AC motors powered by inverters and clarifies the key design points for motors used in variable frequency operation.

As part of the electric drive system, this document also specifies the interface parameters between the motor and the inverter and their mutual influence, including installation instructions.

The voltage at the power supply interface is not included, and this part of the voltage is described by IEC TS61800-8.

The general requirements of other relevant parts of the IEC 60034 series of standards also apply to motors within the scope of this document.

If the motor is operated in an environment with potentially explosive gas, additional

requirements for dust explosion protection are given in the IEC 60079 series.

Security is not the primary focus of this document, but some of the recommendations given involve security issues that must be considered.

If the inverter manufacturer provides specific installation recommendations, those recommendations take precedence over this document.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 755-2025 Ratings and performance of rotating electrical machines (IEC 60034-1:2022, IDT) GB/T 10069.3-2024 Rotating electrical machines - Measurement methods and limits of noise - Part 3: Noise limits (IEC 60034-9.

2021, IDT)

GB/T 12668.8-2017 Adjustable speed electrical drive systems Part 8: Voltage specifications for power interfaces (IEC TS61800-8.

2010, IDT)

performance)

Note: GB/T 755-2025 Ratings and performance of rotating electrical machines (IEC 60034-1:2022, IDT) IEC 60034-2-1 Rotating electrical machines - Part 2-1. Test methods for determining losses and efficiency of rotating electrical machines (other than traction machines) Note. GB/T 25442-2018 Test methods for determining losses and efficiency of rotating electrical machines (other than traction motors) (IEC 60034-2-1:2014, IDT) IEC 60034-2-2 Rotating electrical machines Part 2-2. Specific test methods for determining the losses of large electrical machines - IEC 60034-2-1 Note. GB/T 34861-2017 Special test method for determining the losses of large motors (IEC 60034-2-2:2010, IDT) IEC 60034-2-3 Rotating electrical machines - Part 2-3. Specific tests for determining losses and efficiency of inverter-fed AC induction motors Note. GB/T 32877-2022 Specific test methods for determining losses and efficiency of inverter-fed AC induction motors (IEC 60034-2-3:2020, IDT) cooling(ICCCode)] Note. GB/T 1993-1993 Cooling methods for rotating electrical machines (IEC 60034-6:1991, IDT)