

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Rotating electrical machines –
Part 12: Starting performance of single-speed three phase cage induction
motors**

**Machines électriques tournantes –
Partie 12: Caractéristiques de démarrage des moteurs triphasés à induction à
cage à une seule vitesse**



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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.160.01

ISBN 978-2-8322-8544-2

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

**Part 12: Starting performance of single-speed
three-phase cage induction motors**

FOREWORD

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IEC 60034-12 has been prepared by IEC technical committee 2: Rotating machinery. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

| Clause or subclause | Change |
|---------------------|---|
| Table 6 | Aligned with the requirements for explosion protected motors from TC31 WG27 |
| 12 | New clause on methods for measuring locked-rotor current and torque |
| Annex A | New informative annex on the general current and torque characteristics with locked rotor |
| Annex B | New informative annex on correction of voltage and frequency |

The text of this International Standard is based on the following documents:

| Draft | Report on voting |
|------------|------------------|
| 2/2132/CDV | 2/2150A/RVC |

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 60034 series, published under the general title *Rotating electrical machines*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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ROTATING ELECTRICAL MACHINES –

Part 12: Starting performance of single-speed three-phase cage induction motors

1 Scope

This part of IEC 60034 specifies the parameters for eight designs of starting performance of single-speed three-phase 50 Hz or 60 Hz cage induction motors in accordance with IEC 60034-1 that:

- have a rated voltage up to 1 000 V;
- are intended for direct-on-line or star-delta starting;
- are rated on the basis of duty type S1;
- are constructed to any degree of protection as defined in IEC 60034-5 and explosion protection.

This document also applies to dual voltage motors provided that the flux saturation level is the same for both voltages.

The values of torque, apparent power and current given in this document are limiting values (that is, minimum or maximum without tolerance).

NOTE 1 It is not expected that all manufacturers will produce machines for all eight designs. The selection of any specific design in accordance with this document will be a matter of agreement between the manufacturer and the purchaser.

NOTE 2 Designs other than the eight specified can be necessary for particular applications.

NOTE 3 Values given in manufacturers' catalogues can include tolerances in accordance with IEC 60034-1.

NOTE 4 The values tabled for locked rotor apparent power are based on RMS symmetrical steady state locked rotor currents. The start of the motor leads to transient asymmetrical currents in the whole supply, so called inrush currents, the peak value of which can be from 1,8 to 2,8 times the steady state locked rotor value. The current peak and decay time are a function of the motor design and switching angle. Similar effects can occur during the switchover from star to delta operation. A more detailed description is provided in Annex A.

The application of the methods described in Clause 12 can be applied to cage induction motors outside the scope of this document. However, special care shall be taken in such cases to prevent overheating of the stator or the rotor winding depending on the concrete method and parameters chosen.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-1:2022, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-5:2020, *Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification*

IEC 60034-30-1:2014, *Rotating electrical machines – Part 30-1: Efficiency classes of line-operated AC motors (IE-code)*