

9`Y_f] b]fchUWyg_]glfc`!`&, "XY.`DfYg_i yUbY'a YrcXY'nUi [chUj`Ub`Yj Y]]b
bUXca Ygfb]`g\ Ya `f]Zhb]`b]n_cbUdYrcgfb]`a clcf`Yj`n]bXi`_Wyg_c`_`Yh_c`f197
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Rotating electrical machines - Part 28: Test methods for determining quantities of equivalent circuit diagrams for three-phase low-voltage cage induction motors (IEC 60034-28:2007)

Drehende elektrische Maschinen - Teil 28: Prüfverfahren zur Bestimmung der Größen in Ersatzschaltbildern dreiphasiger (Niederspannungs-Kurzschlussläufer-Induktionsmotoren (IEC 60034-28:2007)

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Ta slovenski standard je istoveten z: EN 60034-28:2007

ICS:

29.160.30 Motorji Motors

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EUROPEAN STANDARD

EN 60034-28

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Part 28: Test methods for determining quantities
of equivalent circuit diagrams
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(IEC 60034-28:2007)**

Machines électriques tournantes -
Partie 28: Méthodes d'essai
pour la détermination des grandeurs
des schémas d'équivalence des circuits
pour moteurs à induction
à cage basse tension triphasés
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Drehende elektrische Maschinen -
Teil 28: Prüfverfahren
zur Bestimmung der Größen
in Ersatzschaltbildern dreiphasiger
Niederspannungs-Kurzschlussläufer-
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CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 2/1415/FDIS, future edition 1 of IEC 60034-28, prepared by IEC TC 2, Rotating machinery, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60034-28 on 2007-05-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2008-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2010-05-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60034-28:2007 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-----------------|---|--------------|--------------------|
| IEC 60034-1 | - ¹⁾ | Rotating electrical machines - Part 1: Rating and performance | EN 60034-1 | 2004 ²⁾ |
| IEC 60044 | Series | Instrument transformers | EN 60044 | Series |
| IEC 60051-1 | - ¹⁾ | Direct acting indicating analogue electrical measuring instruments and their accessories - Part 1: Definitions and general requirements common to all parts | EN 60051-1 | 1998 ²⁾ |
| IEC 60072-1 | - ¹⁾ | Dimensions and output series for rotating electrical machines - Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1 080 | - | - |

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¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

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**NORME
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60034-28

Première édition
First edition
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Machines électriques tournantes –

Partie 28:

Méthodes d'essai pour la détermination des grandeurs des schémas d'équivalence des circuits pour moteurs à induction à cage basse tension triphasés

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Rotating electrical machines –

Part 28:

Test methods for determining quantities of equivalent circuit diagrams for three-phase low-voltage cage induction motors

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

Part 28: Test methods for determining quantities of equivalent circuit diagrams for three-phase low-voltage cage induction motors

FOREWORD

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International Standard IEC 60034-28 has been prepared by IEC technical committee 2: Rotating machinery.

The text of this standard is based on the following documents:

| | |
|-------------|------------------|
| FDIS | Report on voting |
| 2/1415/FDIS | 2/1423/RVD |

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

Equivalent circuits are widely used in the control of adjustable speed drives with induction motors supplied by frequency inverters. The motor parameters are required for the realisation of flux oriented control or other model-based control algorithms. Their knowledge is required by suppliers and system engineers, especially when motors and frequency inverters from different suppliers are combined.

This part of IEC 60034 provides a standardized test procedure to determine the electric motor parameters. At the same time this standard offers an improved understanding of the equivalent circuit method. The procedures can be carried out in laboratories equipped for standard electric machinery tests.

NOTE The standard's main purpose is for assistance in modelling frequency controlled motors. Due to the simplifications, the results cannot be used to determine motor performance or efficiency accurately.

A related technical specification is IEC 60034-25: "Guide for the design and performance of cage induction motors specifically designed for converter supply" where required motor parameters are listed, but their definition and methods of their determination are not included.

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ROTATING ELECTRICAL MACHINES –

Part 28: Test methods for determining quantities of equivalent circuit diagrams for three-phase low-voltage cage induction motors

1 Scope

This part of IEC 60034 applies to three-phase low-voltage cage induction motors of frame numbers 56 to 400 as specified in IEC 60072-1.

This standard establishes procedures to obtain values for elements of single phase equivalent circuit diagrams from tests and defines standard elements of these diagrams.

2 Normative references

The following referenced documents are indispensable for the application 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, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60044 (all parts), *Instrument transformers*

IEC 60051-1, *Direct acting indicating analogue electrical measuring instruments and their accessories – Part 1: Definitions and general requirements common to all parts*

IEC 60072-1, *Dimensions and output series for rotating electrical machines – Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080*

3 Terms, definitions and symbols

For the purposes of this document, the terms and definitions given in IEC 60034-1 apply. The following symbols apply.

3.1 Symbols

$\cos \varphi$ is the power factor

$\cos \varphi_N$ is the rated power factor

f_1 is the stator supply frequency, s^{-1}

f_r is the frequency of the rotor current (slip frequency), s^{-1}

f_N is the rated frequency, s^{-1}

h is the height of the rotor-conductor bar, m