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**Rotacijski električni stroji – 1. del: Naznačene vrednosti in lastnosti (IEC 60034-1:2004)**

Rotating electrical machines - Part 1: Rating and performance (IEC 60034-1:2004)

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EUROPEAN STANDARD

**EN 60034-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2004

ICS 29.160

Supersedes EN 60034-1:1998 + A1:1998 + A2:1999 + A11:2002

English version

**Rotating electrical machines**  
**Part 1: Rating and performance**  
(IEC 60034-1:2004)

Machines électriques tournantes  
Partie 1: Caractéristiques assignées  
et caractéristiques de fonctionnement  
(CEI 60034-1:2004)

Drehende elektrische Maschinen  
Teil 1: Bemessung und Betriebsverhalten  
(IEC 60034-1:2004)

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This European Standard was approved by CENELEC on 2004-06-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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**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 2/1278/FDIS, future edition 11 of IEC 60034-1, prepared by IEC TC 2, Rotating machinery, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60034-1 on 2004-06-01.

This European Standard supersedes EN 60034-1:1998 + corrigendum February 2000 + A1:1998 + A2:1999 + A11:2002.

The major changes introduced in this edition are:

Clause or Subclause	Change
7.2.2	New requirements for a.c. generators to supply non-linear circuits
8	Major changes to Tables 4, 7 and 9
9.1	New requirements for routine tests
9.2	Table 16 Test voltages of auxiliaries
9.11	Total harmonic distortion for synchronous machines
11.1	Protective earthing for machines
12.1	Table 20 Tolerance on efficiency
13	Electromagnetic compatibility

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) 2005-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-06-01

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60034-1:2004 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 Where 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 60027-1	- <sup>1)</sup>	Letter symbols to be used in electrical technology Part 1: General	HD 60027-1	2004 <sup>2)</sup>
IEC 60027-4	- <sup>1)</sup>	Part 4: Symbols for quantities to be used for rotating electrical machines	HD 245.4 S1	1987 <sup>2)</sup>
IEC 60034-2	- <sup>1)</sup>	Rotating electrical machines Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)	EN 60034-2	1996 <sup>2)</sup>
IEC 60034-3	- <sup>1)</sup>	Part 3: Specific requirements for turbine-type synchronous machines	EN 60034-3	1995 <sup>2)</sup>
IEC 60034-5	- <sup>1)</sup>	Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification	EN 60034-5	2001 <sup>2)</sup>
IEC 60034-6	- <sup>1)</sup>	Part 6: Methods of cooling (IC Code)	EN 60034-6	1993 <sup>2)</sup>
IEC 60034-8	- <sup>1)</sup>	Part 8: Terminal markings and direction of rotation	EN 60034-8	2002 <sup>2)</sup>
IEC 60034-12	- <sup>1)</sup>	Part 12: Starting performance of single-speed three-phase cage induction motors	EN 60034-12	2002 <sup>2)</sup>
IEC 60034-15	- <sup>1)</sup>	Part 15: Impulse voltage withstand levels of rotating a.c. machines with form-wound stator coils	EN 60034-15	1996 <sup>2)</sup>
IEC/TS 60034-17	- <sup>1)</sup>	Part 17: Cage induction motors when fed from converters - Application guide	CLC/TS 60034-17	
IEC 60034-18	Series	Part 18: Functional evaluation of insulation systems	EN 60034-18	Series

1) Undated reference.

2) Valid edition at date of issue.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60038 (mod)	- <sup>1)</sup>	IEC standard voltages <sup>3)</sup>	HD 472 S1	1989 <sup>2)</sup>
IEC 60050-411	1996	International Electrotechnical Vocabulary (IEV) Chapter 411: Rotating machines	-	-
IEC 60060-1	- <sup>1)</sup>	High-voltage test techniques Part 1: General definitions and test requirements	HD 588.1 S1	1991 <sup>2)</sup>
IEC 60072-3	- <sup>1)</sup>	Dimensions and output series for rotating electrical machines Part 3: Small built-in motors - Flange numbers BF10 to BF50	-	-
IEC 60204-1	- <sup>1)</sup>	Safety of machinery - Electrical equipment of machines Part 1: General requirements	EN 60204-1 + corr. September	1997 <sup>2)</sup> 1998
IEC 60204-11	- <sup>1)</sup>	Part 11: Requirements for HV equipment for voltages above 1 000 V a.c. or 1 500 V d.c. and not exceeding 36 kV	EN 60204-11	2000 <sup>2)</sup>
IEC 60279	- <sup>1)</sup>	Measurement of the winding resistance of an a.c. machine during operation at alternating voltage	-	-
IEC 60335-1 (mod)	- <sup>1)</sup>	Household and similar electrical appliances - Safety Part 1: General requirements	EN 60335-1 + A11	2002 <sup>2)</sup> 2004
IEC 60445	- <sup>1)</sup>	Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals and of terminations of certain designated conductors, including general rules for an alphanumeric system	EN 60445	2000 <sup>2)</sup>
IEC 60971	- <sup>1)</sup>	Semiconductor convertors. Identification code for convertor connections	-	-
IEC 61293	- <sup>1)</sup>	Marking of electrical equipment with ratings related to electrical supply - Safety requirements	EN 61293	1994 <sup>2)</sup>
IEC 61986	- <sup>1)</sup>	Rotating electrical machines - Equivalent loading and super-position techniques - Indirect testing to determine temperature rise	EN 61986	2002 <sup>2)</sup>
IEC 62114	- <sup>1)</sup>	Electrical insulation systems (EIS) - Thermal classification	EN 62114	2001 <sup>2)</sup>

<sup>3)</sup> The title of HD 472 S1 is : Nominal voltages for low-voltage public electricity supply systems.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 11	- <sup>1)</sup>	Industrial scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement	-	-
CISPR 14	Series	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus	EN 55014	Series
CISPR 16	Series	Specification for radio disturbance and immunity measuring apparatus and methods	EN 55016	Series

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# INTERNATIONAL STANDARD

# IEC 60034-1

Eleventh edition  
2004-04

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## Rotating electrical machines –

### Part 1: Rating and performance

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## ROTATING ELECTRICAL MACHINES –

## Part 1: Rating and performance

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60034-1 has been prepared IEC technical committee 2: Rotating machinery.

This eleventh edition cancels and replaces the tenth edition published in 1996, its amendments 1 (1997) and 2 (1999). It constitutes a technical revision.

The major changes introduced in this edition are:

Clause or subclause	Change
7.2.2	New requirements for a.c. generators to supply non-linear circuits
8	Major changes to Tables 4, 7 and 9
9.1	New requirements for routine tests
9.2	Table 16 Test voltage of auxiliaries
9.11	Total harmonic distortion for synchronous machines
11.1	Protective earthing of machines
12.1	Table 20 Tolerance on efficiency
13	Electromagnetic compatibility

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

FDIS	Report on voting
2/1278/FDIS	2/1294/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.

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

SIST EN 60034-1:2005

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

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

## ROTATING ELECTRICAL MACHINES –

### Part 1: Rating and performance

#### 1 Scope

This part of IEC 60034 is applicable to all rotating electrical machines except those covered by other IEC standards, for example, IEC 60349.

Machines within the scope of this standard may also be subject to superseding, modifying or additional requirements in other publications, for example, IEC 60079, and IEC 60092.

NOTE If particular clauses of this standard are modified to meet special applications, for example machines subject to radioactivity or machines for aerospace, all other clauses apply insofar as they are compatible.

#### 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.

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IEC 60027-1, *Letter symbols to be used in electrical technology – Part 1: General*

IEC 60027-4, *Letter symbols to be used in electrical technology – Part 4: Symbols for quantities to be used for rotating electrical machines*

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IEC 60034-2, *Rotating electrical machines – Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)*

IEC 60034-3, *Rotating electrical machines – Part 3: Specific requirements for turbine-type synchronous machines*

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

IEC 60034-6, *Rotating electrical machines – Part 6: Methods of cooling (IC code)*

IEC 60034-8, *Rotating electrical machines – Part 8: Terminal markings and direction of rotation*

IEC 60034-12, *Rotating electrical machines – Part 12: Starting performance of single-speed three-phase cage induction motors*

IEC 60034-15, *Rotating electrical machines – Part 15: Impulse voltage withstand levels of rotating a.c. machines with form-wound stator coils*

IEC 60034-17, *Rotating electrical machines – Part 17: Cage induction motors when fed from converters – Application guide*