IEC 60034-1

Edition 13.0 2017-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Rotating electrical machines –
Part 1: Rating and performance

Machines électriques tournantes –
Partie 1: Caractéristiques assignées et caractéristiques de fonctionnement

IEC 60034-1:2017-05(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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 by IEC technical committee 2: Rotating machinery.

This thirteenth edition cancels and replaces the twelfth edition published in 2010. It constitutes a technical revision.

The main technical changes with regard to the previous edition are as follows:

Clause or subclause	Change
3.25	Shorter time to thermal equilibrium
5.5.2	Note on P-Q capability diagram for synchronous generators
6.4	Clarification added that other conditions can be agreed on
6.6	Clarification added that standstill is explicitly included; note added
7.1	Clarification on bus transfer or fast reclosing
	Capability to withstand impulse voltages in case of machines connected to a U converter
7.2.4	New Table 3 for identification code
7.3	Table 4 corrected to reflect current scope of IEC 60034-3
7.5	Voltage withstand level for machines connected to a converter
8.3.4	Measurement of ambient air temperature in case of open machines
8.6.3.4	Notes on ETD in the end windings of high voltage machines and on ETD use to monitor strand blockage in case of directly liquid cooled windings
8.10	Clarification on temperature limit
	Clarification on temperature difference between method R and method ETD
	Clarification that temperature limit acc. to method R must always be kept
	Note on measured temperature limits between methods R and ETD
	Table 8 and Table 11 extended incorporating thermal class 200 (N)
	Line 4c) of Table 8 restricted to field windings of DC machines
	Temperature limits in Table 8 changed according to 2/1737/DC and the comments received on this document
	Physically correct formula in Table 10, item 1b
9.1	Clarification on machines that are subject to routine testing
9.2	Separate withstand voltage testing of phases
	Clarification on frequency and time instant for withstand voltage test
	Note on leakage current during withstand voltage test
	Note referring to IEC 60027
10.2	Information on IVIC on rating plate or in documentation
	Clarification added to item f
	IC code and design letter for locked-rotor apparent power on rating plate
11.1	Clarification on cross-sectional area of earthing conductor for generators
	Note on grounding for small machines added
12.2	Tolerance on field current of synchronous machines added
	Tolerance on power factor applies also for PM synchronous machines operated directly at the lines
	Contradiction between tolerances on efficiency and on losses clarified
13.1	Changed as proposed by ACEC
	Note for large generators added
13.3	Changed as proposed by ACEC
13.5	Changed as proposed by ACEC
Annex B	DC power supply added

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

FDIS	Report on voting
2/1857/FDIS	2/1863/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 the IEC 60034 series, published under the general title *Rotating electrical machines,* can be found on the IEC website.

NOTE A table of cross-references of all IEC TC 2 publications can be found in the IEC TC 2 dashboard on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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.

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 document may also be subject to superseding, modifying or additional requirements in other standards, for example, IEC 60079 and IEC 60092.

NOTE If particular clauses of this document 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 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 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: Rotating electric machines*

IEC 60034-2 (all parts), *Rotating electrical machines – Part 2: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)*

IEC 60034-3, *Rotating electrical machines – Part 3: Specific requirements for synchronous generators driven by steam turbines or combustion gas turbines*

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 60034-12:2016, *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 form-wound stator coils for rotating a.c. machines*

IEC 60034-18 (all parts), *Rotating electrical machines – Part 18: Functional evaluation of insulation systems*

IEC 60034-18-41, *Rotating electrical machines – Part 18-41: Partial discharge free electrical insulation systems (Type I) used in rotating electrical machines fed from voltage converters – Qualification and quality control tests*