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INTERNATIONAL STANDARD

REDLINE VERSION

**Rotating electrical machines -
Part 1: Rating and performance**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Rotating electrical machines -
Part 1: Rating and performance**

FOREWORD

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IEC 60034-1 has been prepared by IEC technical committee 2: Rotating machinery. It is an International Standard.

This fifteenth edition cancels and replaces the fourteenth edition published in 2022. This edition constitutes a technical revision.

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

Clause, subclause or table number	Change
1	Clarification with respect to machines with integrated EMC-active components added
2	Normative references updated
3	Note on meaning of "agreement" deleted; list of abbreviations added
4.2.9, 4.2.10	References to IEC TS 60034-25 deleted, as converter duty is now defined in 3.36
5.1	Reference to IEC TS 60034-25 converted into note
6.6	Clarification of requirements
7.2.1	Reference to IEC TS 60034-25 converted into note
7.5	Clarification of requirements
7.6	Reference to IEC TS 60034-25 converted into note
8.1	Clarification of references
8.6.1	Clarification on choice of method for large machines
Table 11	Updated values for thermal class 200 (N)
8.10.3	Clarification of requirements
9.2	Clarification on test voltage for old machines after rewinding
Table 17	Items 9 and 10 merged and clarified
9.7	Clarification on overspeed test for machines held at stock added
Table 20	Clarification on test speed for converter duty machines
10.2	Clarification of term 'digital form'
10.3	Note on QR code deleted
11.1	Reference to protective earth test added
13.1	Clarifying flowchart added
13.2.2	Clarification on motors with integrated VSD added
13.3	Clarification of requirements after consultation with ACEC
13.5	Clarification of requirements after consultation with ACEC
14	Note on safety converted to normal text

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

Draft	Report on voting
2/2257/FDIS	2/2296/RVD

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/standardsdev/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.

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

- reconfirmed,
- withdrawn, or
- revised.

1 Scope

This part of IEC 60034 is applicable to all rotating electrical machines, except rotating electrical machines for rail and road vehicles, which are covered by the IEC 60349 series of standards.

Machines with integrated EMC-active components such as a variable frequency converter are considered being a power drive system (see the IEC 61800 series of standards). In such cases, this document applies to the motor component of the power drive system only.

Machines within the scope of this document ~~may~~ can 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:~~1992~~, *Letters symbols to be used in electrical technology - Part 1: General*
~~IEC 60027-1:1992/AMD1:1997~~
~~IEC 60027-1:1992/AMD2:2005~~

IEC 60027-4:~~2006~~, *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:~~2020~~, *Rotating electrical machines - Part 3: Specific requirements for synchronous generators driven by steam turbines or combustion gas turbines and for synchronous compensators*

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 60034-6:~~1991~~, *Rotating electrical machines - Part 6: Methods of cooling (IC code)*

IEC 60034-8:~~2007~~, *Rotating electrical machines - Part 8: Terminal markings and direction of rotation*
~~IEC 60034-8:2007/AMD1:2014~~

IEC 60034-12:2016, *Rotating electrical machines - Part 12: Starting performance of single-speed three-phase cage induction motors*

IEC 60034-15:~~2009~~, *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:~~2014~~, *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*

~~IEC 60034-18-41:2014/AMD1:2019~~

IEC 60034-18-42:~~2017~~, *Rotating electrical machines - Part 18-42: Partial discharge resistant electrical insulation systems (Type II) used in rotating electrical machines fed from voltage converters - Qualification tests*

~~IEC 60034-18-42:2017/AMD1:2020~~

~~IEC 60034-19:2014, Rotating electrical machines - Part 19: Specific test methods for d.c. machines on conventional and rectifier-fed supplies~~

~~IEC TS 60034-25:2014, Rotating electrical machines - Part 25: AC electrical machines used in power drive systems - Application guide~~

IEC 60034-27-4, *Rotating electrical machines - Part 27-4: Measurement of insulation resistance and polarization index of winding insulation of rotating electrical machines*

IEC 60034-29:~~2008~~, *Rotating electrical machines - Part 29: Equivalent loading and superposition techniques - Indirect testing to determine temperature rise*

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

~~IEC TS 60034-30-2, Rotating electrical machines - Part 30-2: Efficiency classes of variable speed AC motors (IE-code)~~

IEC 60034-30-3, *Rotating electrical machines - Part 30-3: Efficiency classes of high voltage AC motors (IE-code)*

IEC 60034-33, *Rotating electrical machines - Part 33: ~~Specific technical requirements for hydro generators~~ Synchronous hydrogenerators including motor-generators - Specific requirements*

IEC 60050-411:1996, *International Electrotechnical Vocabulary (IEV) - Part 411: Rotating machinery*

~~IEC 60050-411:1996/AMD1:2007~~

~~IEC 60050-411:1996/AMD2:2021~~

IEC 60060-1:~~2010~~, *High-voltage test techniques - Part 1: General terminology and test requirements*

IEC 60085:~~2007~~, *Electrical insulation - Thermal evaluation and designation*

IEC 60204-1:~~2016~~, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

IEC 60204-11:~~2018~~, *Safety of machinery - Electrical equipment of machines - Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV*

IEC 60335-1:2020, *Household and similar electrical appliances - Safety - Part 1: General requirements*

IEC 60364 (all parts), *Low-voltage electrical installations*

Bibliography

IEC 60034-7, *Rotating electrical machines - Part 7: Classification of types of construction, mounting arrangements and terminal box position (IM Code)*

IEC 60034-9, *Rotating electrical machines - Part 9: Noise limits*

IEC 60034-11, *Rotating electrical machines - Part 11: Thermal protection*

IEC 60034-14, *Rotating electrical machines - Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity*

IEC 60034-18-1:2022, *Rotating electrical machines - Part 18-1: Functional evaluation of insulation systems - General guidelines*

IEC 60034-18-21, *Rotating electrical machines - Part 18-21: Functional evaluation of insulation systems - Test procedures for wire-wound windings - Thermal evaluation and classification*

IEC 60034-18-31, *Rotating electrical machines - Part 18-31: Functional evaluation of insulation systems - Test procedures for form-wound windings - Thermal evaluation and classification of insulation systems used in rotating machines*

IEC 60034-18-32:2022, *Rotating electrical machines - Part 18-32: Functional evaluation of insulation systems (Type II) - Electrical endurance qualification procedures for form-wound windings*

IEC 60034-18-34:2012, *Rotating electrical machines - Part 18-34: Functional evaluation of insulation systems - Test procedures for form-wound windings - Evaluation of thermomechanical endurance of insulation systems*

IEC 60034-19:2014, *Rotating electrical machines - Part 19: Specific test methods for d.c. machines on conventional and rectifier-fed supplies*

IEC TS 60034-24:2009, *Rotating electrical machines - Part 24: Online detection and diagnosis of potential failures at the active parts of rotating electrical machines and of bearing currents - Application guide*

IEC TS 60034-25:2022, *Rotating electrical machines - Part 25: AC electrical machines used in power drive systems - Application guide*

IEC 60034-27 (all parts), *Rotating electrical machines - Part 27: Off-line partial discharge measurements on the stator winding insulation of rotating electrical machines*

IEC TS 60034-30-2, *Rotating electrical machines - Part 30-2: Efficiency classes of variable speed AC motors (IE-code)*

IEC 60079 (all parts), *Explosive atmospheres*

IEC 60092 (all parts), *Electrical installations in ships*

IEC TS 61800-8, *Adjustable speed electrical power drive systems - Part 8: Specification of voltage on the power interface*

IEC 60276:2018, *Carbon brushes, brush holders, commutators and slip-rings - Definitions and nomenclature*

IEC 60349 (all parts), *Electric traction - Rotating electrical machines for rail and road vehicles*

IEC 60884-2-4, *Plugs and socket-outlets for household and similar purposes - Part 2-4: Particular requirements for plugs and socket-outlets for SELV*

IEC 61148:2011, *Terminal markings for valve device stacks and assemblies and for power conversion equipment*

IEC 62477-1, *Safety requirements for power electronic converter systems and equipment - Part 1: General*

IEC GUIDE 115:2021, *Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector*

ISO/IEC 18004:2015, *Information technology - Automatic identification and data capture techniques - QR Code bar code symbology specification*
