

Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification (IEC 60034-5:2000)

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EUROPEAN STANDARD

EN 60034-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2001

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Supersedes EN 60034-5:1986

English version

Rotating electrical machines
Part 5: Degrees of protection provided by the integral design
of rotating electrical machines (IP code) -
Classification
(IEC 60034-5:2000)

Machines électriques tournantes
Partie 5: Degrés de protection procurés
par la conception intégrale des machines
électriques tournantes (code IP) -
Classification
(CEI 60034-5:2000)

Drehende elektrische Maschinen
Teil 5: Schutzarten aufgrund der
Gesamtkonstruktion von drehenden
elektrischen Maschinen (IP-Code) -
Einteilung
(IEC 60034-5:2000)

STANDARD PREVIEW
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SIST EN 60034-5:2002
This European Standard was approved by CENELEC on 2000-12-01. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and 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 2/1098/FDIS, future edition 4 of IEC 60034-5, prepared by IEC TC 2, Rotating machinery, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60034-5 on 2000-12-01.

This European Standard supersedes EN 60034-5:1986.

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) 2001-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-12-01

Annexes designated "normative" are part of the body of the standard.

In this standard, annex ZA is normative.

Annex ZA has been added by CENELEC.

Endorsement notice

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The text of the International Standard IEC 60034-5:2000 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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 (mod)	1)	Rotating electrical machines Part 1: Rating and performance	EN 60034-1 + corr. February	1998 ²⁾ 2000
IEC 60034-6	1)	Part 6: Methods of cooling (IC Code)	EN 60034-6	1993 ²⁾

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¹⁾ undated reference.

²⁾ valid edition at date of issue.

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**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC**

60034-5

Quatrième édition
Fourth edition
2000-12

Machines électriques tournantes –

**Partie 5:
Degrés de protection procurés par la conception
intégrale des machines électriques tournantes
(code IP) – Classification**

Rotating electrical machines –

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

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

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

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60034-5 has been prepared by IEC technical committee 2: Rotating machinery.

This fourth edition cancels and replaces the third edition issued in 1991 and constitutes a technical revision.

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

FDIS	Report on voting
2/1098/FDIS	2/1114/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 3.

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 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification

1 Scope and object

This International Standard applies to the classification of degrees of protection provided by enclosures for rotating electrical machines. It defines the requirements for protective enclosures that are in all other respects suitable for their intended use and which, from the point of view of materials and workmanship, ensure that the properties dealt with in this standard are maintained under normal conditions of use.

This standard does not specify:

- degrees of protection against mechanical damage of the machine, or conditions such as moisture (produced for example by condensation), corrosive vapours, fungus or vermin;
- types of protection of machines for use in an explosive atmosphere;
- the requirements for barriers external to the enclosure which have to be provided solely for the safety of personnel.

In certain applications (such as agricultural or domestic appliances), more extensive precautions against accidental or deliberate contact may be specified.

This standard gives definitions for standard degrees of protection provided by enclosures applicable to rotating electrical machines as regards the:

- a) protection of persons against contacts with or approach to live parts and against contact with moving parts (other than smooth rotating shafts and the like) inside the enclosure and protection of the machine against ingress of solid foreign objects;
- b) protection of machines against the harmful effects due to ingress of water.

It gives designations for these protective degrees and tests to be performed to check that the machines meet the requirements of this standard.

2 Normative references (standards.iteh.ai)

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60034. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60034 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

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

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

3 Designation

The designation used for the degree of protection consists of the letters IP followed by two characteristic numerals signifying conformity with the conditions indicated in the tables of clauses 4 and 5 respectively.

3.1 Single characteristic numeral

When it is required to indicate a degree of protection by only one characteristic numeral, the omitted numeral shall be replaced by the letter X, for example IPX5 or IP2X.

3.2 Supplementary letters

Additional information may be indicated by a supplementary letter following the second characteristic numeral. If more than one letter is used, the alphabetic sequence shall apply.

3.2.1 In special applications (such as machines with open circuit cooling for ship deck installation with air inlet and outlet openings closed during standstill), numerals may be followed by a letter indicating whether the protection against harmful effects due to ingress of water was verified or tested for the machine not running (letter S) or the machine running (letter M). In this case, the degree of protection in either state of the machine shall be indicated, for example IP55S/IP20M.

The absence of the letters S and M shall imply that the intended degree of protection will be provided under all normal conditions of use.

3.2.2 For air-cooled open machines suitable for specific weather conditions and provided with additional protective features or processes (as specified in clause 10), the letter W may be used.

3.3 Example of designation

	IP	4	4
Characteristic letters			
First characteristic numeral (see table 2)			
Second characteristic numeral (see table 3)			

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* A consolidated edition 10.2 (1999) was issued comprising IEC 60034-1 (1996) and its amendments 1 (1997) and 2 (1999).