

STN	Točivé elektrické stroje Časť 5: Stupne ochrany krytmi točivých elektrických strojov (kód IP) Klasifikácia	STN EN IEC 60034-5 35 0000
------------	---	--

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

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/20

Obsahuje: EN IEC 60034-5:2020, IEC 60034-5:2020

Oznámením tejto normy sa od 03.06.2023 ruší
STN EN 60034-5 (35 0000) z decembra 2002

EUROPEAN STANDARD

EN IEC 60034-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2020

ICS 29.160.01

Supersedes EN 60034-5:2001 and all of its amendments
and corrigenda (if any)

English Version

**Rotating electrical machines - Part 5: Degrees of protection
provided by the integral design of rotating electrical machines (IP
code) - Classification
(IEC 60034-5:2020)**

Machines électriques tournantes - Partie 5: Degrés de
protection procurés par la conception intégrale des
machines électriques tournantes (code IP) - Classification
(IEC 60034-5:2020)

Drehende elektrische Maschinen - Teil 5: Schutzarten
aufgrund der Gesamtkonstruktion von drehenden
elektrischen Maschinen (IP-Code) - Einteilung
(IEC 60034-5:2020)

This European Standard was approved by CENELEC on 2020-06-03. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 60034-5:2020 (E)**European foreword**

The text of document 2/1960/CDV, future edition 5 of IEC 60034-5, prepared by IEC/TC 2 "Rotating machinery" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60034-5:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-03-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-06-03

This document supersedes EN 60034-5:2001 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60034-5:2020 was approved by CENELEC as a European Standard without any modification.

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60034-6	-	Rotating electrical machines - Part 6: Methods of cooling (IC Code)	EN 60034-6	-



IEC 60034-5

Edition 5.0 2020-04

INTERNATIONAL STANDARD

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





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.



IEC 60034-5

Edition 5.0 2020-04

INTERNATIONAL STANDARD

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.160.01

ISBN 978-2-8322-8025-6

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Designation	7
4.1 General.....	7
4.2 Single characteristic numeral	7
4.3 Supplementary letters	7
4.4 Example of designation.....	7
5 Degrees of protection – First characteristic numeral	7
5.1 Indication of degree of protection	7
5.2 Compliance to indicated degree of protection.....	8
5.3 External fans.....	8
5.4 Drain holes	8
6 Degrees of protection – Second characteristic numeral	9
6.1 Indication of the degree of protection	9
6.2 Compliance with lower degrees of protection	10
7 Marking	10
8 General requirements for tests	11
8.1 General.....	11
8.2 Adequate clearance	11
8.2.1 General	11
8.2.2 Low-voltage machines (rated voltages not exceeding 1 000 V a.c. and 1 500 V d.c.).....	11
8.2.3 High-voltage machines (rated voltages exceeding 1 000 V a.c. and 1 500 V d.c.).....	11
9 Tests for first characteristic numeral	11
10 Tests for second characteristic numeral.....	15
10.1 Test conditions	15
10.2 Acceptance conditions	23
10.2.1 General	23
10.2.2 Ingress of water.....	24
10.2.3 Withstand voltage test	24
11 Requirements and tests for open weather-protected machines	24
Figure 1 – Standard test finger.....	14
Figure 2 – Equipment to prove protection against dust.....	15
Figure 3 – Equipment to prove protection against dripping water	18
Figure 4 – Equipment to prove protection against spraying and splashing water (shown with spraying holes in the case of second characteristic numeral 3).....	19
Figure 5 – Hand-held equipment to prove protection against spraying and splashing water	20
Figure 6 – Standard nozzle for hose test.....	20
Figure 7 – Geometry of fan jet nozzle	21
Figure 8 – Measurement of the impact force	22

Figure 9 – Test set-up for determining the protection against high-pressure/steam-jet cleaning – degree of protection against ingress of water IP X9 for small enclosures 23

Table 1 – Test requirements for guards..... 8

Table 2 – Degrees of protection indicated by the first characteristic numeral 9

Table 3 – Degrees of protection indicated by the second characteristic numeral 10

Table 4 – Test and acceptance conditions for first characteristic numeral 12

Table 5 – Test conditions for second characteristic numeral 16

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 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.
- 2) The formal decisions or agreements of 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. 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 fifth edition cancels and replaces the fourth edition, published in 2000, and its Amendment 1:2006. This edition constitutes a technical revision.

The main technical changes with respect to the previous edition are:

- the inclusion of an additional second numeral 9 including its test method,
- an additional note for clarification in Table 3,
- a clarification on the term open drain hole,
- a clarification on the ingress of dust in Table 4,
- pressure values given now in Pa only,
- a clarification in the scope on the applicability of this standard for (Ex) motors,
- a new Clause 3 with definitions,

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

CDV	Report on voting
2/1960/CDV	2/1972A/RVC

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

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

A list of all parts in the IEC 60034 series, published under the general title *Rotating electrical machines*, can be found 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

ROTATING ELECTRICAL MACHINES –

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

1 Scope

This part of IEC 60034 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 document are maintained under normal conditions of use.

This document does not specify degrees of protection against mechanical damage of the machine, or conditions such as moisture (produced for example by condensation), corrosive dust and vapour, fungus or vermin.

This document is also applicable to explosion proof machines, but it does not specify the types of protection for use in a potentially explosive (dust, gas) environment. Those are defined in the IEC 60079 series of standards.

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

This document 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;
- c) protection of machines against the harmful effects due to ingress of dust.

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

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

koniec náhľadu – text ďalej pokračuje v platenej verzii STN