SLOVENSKI STANDARD
SIST EN 60349-1:2011

01-januar-2011

Nadomešča:
SIST EN 60349-1:2001
SIST EN 60349-1:2001/A1:2003

Električna vleka - Rotacijski električni stroji za železniška in cestna vozila - 1. del: Stroji, razen elektronsko napajanih izmeničnih motorjev (IEC 60349-1:2010)

Electric traction - Rotating electrical machines for rail and road vehicles - Part 1: Machines other than electronic convertor-fed alternating current motors (IEC 60349-1:2010)

Elektrische Zugförderung - Drehende elektrische Maschinen für Bahn- und Straßenfahrzeuge - Teil 1: Elektrische Maschinen ausgenommen umrichtergespeiste Wechselstrommotoren (IEC 60349-1:2010)

Traction électrique - Machines électriques tournantes des véhicules ferroviaires et routiers - Partie 1: Machines autres que les moteurs à courant alternatif alimentés par convertisseur électronique (CEI 60349-1:2010)

Ta slovenski standard je istoveten z: **EN 60349-1:2010**

ICS:

29.160.01	Rotacijski stroji na splošno	Rotating machinery in general
29.280	Električna vlečna oprema	Electric traction equipment

SIST EN 60349-1:2011 **en,fr**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60349-1

November 2010

ICS 45.060

Supersedes EN 60349-1:2000 + A1:2002

English version

Electric traction - Rotating electrical machines for rail and road vehicles - Part 1: Machines other than electronic converter-fed alternating current motors

(IEC 60349-1:2010)

Traction électrique - Machines électriques tournantes des véhicules ferroviaires et routiers - Partie 1: Machines autres que les moteurs à courant alternatif alimentés par convertisseur électronique
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(IEC 60349-1:2010)

This European Standard was approved by CENELEC on 2010-11-01. 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, 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60349-1:2010 E

Foreword

The text of document 9/1415/FDIS, future edition 2 of IEC 60349-1, prepared by IEC TC 9, Electrical equipment and systems for railways, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60349-1 on 2010-11-01.

This European Standard supersedes EN 60349-1:2000 + A1:2002.

The main technical changes with regard to EN 60349-1:2000 + A1:2002 are as follows:

– As the limits of vibration velocities have been changed in EN 60034-14, the limits valid for traction motors are now directly stated in this standard.

– In addition to the existing method for measuring and calculating the sound power level, the methods described in EN ISO 3741, EN ISO 3743 (all parts), EN ISO 3744, EN ISO 3745 and EN ISO 9614 (all parts) are also allowed. However the maximum sound power levels and the correction for pure tones remain unchanged in C.7 and C.8.

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

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) 2011-08-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2013-11-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60349-1:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60034-2-1	NOTE	Harmonized as EN 60034-2-1.
IEC 60034-9	NOTE	Harmonized as EN 60034-9.
IEC 60034-14	NOTE	Harmonized as EN 60034-14.
IEC 61260	NOTE	Harmonized as EN 61260.
IEC 61287 series	NOTE	Harmonized in EN 61287 series (not modified).
IEC 61373	NOTE	Harmonized as EN 61373.
IEC 61377-2	NOTE	Harmonized as EN 61377-2.
IEC 61672	NOTE	Harmonized as EN 61672.
ISO 3741	NOTE	Harmonized as EN ISO 3741.
ISO 3743-1	NOTE	Harmonized as EN ISO 3743-1.
ISO 3743-2	NOTE	Harmonized as EN ISO 3743-2.

ISO 3744	NOTE Harmonized as EN ISO 3744.
ISO 3745	NOTE Harmonized as EN ISO 3745.
ISO 3746	NOTE Harmonized as EN ISO 3746.
ISO 3747	NOTE Harmonized as EN ISO 3747.
ISO 9614-1	NOTE Harmonized as EN ISO 9614-1.
ISO 9614-2	NOTE Harmonized as EN ISO 9614-2.

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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60034-1 (mod)	-	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1	-
IEC 60034-8	-	Rotating electrical machines - Part 8: Terminal markings and direction of rotation	EN 60034-8	-
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60638	-	Criteria for assessing and coding of the commutation of rotating electrical machines for traction	-	-
IEC 62498-1	-	Railway applications - Environmental conditions for equipment - Part 1: Equipment on board rolling stock	-	-

IEC 60349-1

Edition 2.0 2010-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electric traction – Rotating electrical machines for rail and road vehicles – Part 1: Machines other than electronic converter-fed alternating current motors

Traction électrique – Machines électriques tournantes des véhicules ferroviaires et routiers – Partie 1: Machines autres que les moteurs à courant alternatif alimentés par convertisseur électronique

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX XB

ICS 45.060

ISBN 978-2-88912-182-3

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRIC TRACTION – ROTATING ELECTRICAL MACHINES FOR RAIL AND ROAD VEHICLES –

Part 1: Machines other than electronic converter-fed alternating current motors

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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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 60349-1 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This second edition cancels and replaces the first edition, published in 1999, and its amendment 1 (2002) of which it constitutes a technical revision.

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

– As the limits of vibration velocities have been changed in IEC 60034-14, the limits valid for traction motors are now directly stated in this standard.

– In addition to the existing method for measuring and calculating the sound power level, the methods described in ISO 3741, ISO 3743, ISO 3744, ISO 3745 and ISO 9614 are also allowed. However the maximum sound power levels and the correction for pure tones remain unchanged in Clauses C.7 and C.8.

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

FDIS	Report on voting
9/1415/FDIS	9/1465/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.

The list of all parts of IEC 60349 series, published under the general title, *Electric traction – Rotating electrical machines for rail and road vehicles,* can be found 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 web site 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.

ELECTRIC TRACTION – ROTATING ELECTRICAL MACHINES FOR RAIL AND ROAD VEHICLES –

Part 1: Machines other than electronic converter-fed alternating current motors

1 Scope and object

This part of IEC 60349 is applicable to rotating electrical machines, other than electronic converter-fed alternating current motors, forming part of the equipment of electrically propelled rail and road vehicles. The vehicles may obtain power either from an external supply or from an internal source.

The object of this standard is to enable the performance of a machine to be confirmed by tests and to provide a basis for assessment of its suitability for a specified duty and for comparison with other machines.

Where further testing is to be undertaken in accordance with IEC 61377-2, it may be preferable, to avoid duplication, that some type and investigation tests be carried out on the combined test bed.

NOTE 1 This standard also applies to machines installed on trailers hauled by electrically propelled vehicles.

NOTE 2 The basic requirements of this standard may be applied to rotating electrical machines for special purpose vehicles such as mine locomotives, but it does not cover flameproof or other special features that may be required.

NOTE 3 It is not intended that this standard should apply to machines on small road vehicles such as battery-fed delivery vehicles, works trucks, etc. Neither does it apply to minor machines such as windscreen wiper motors, etc. that may be used on all types of vehicles.

NOTE 4 Industrial type machines complying with the IEC 60034 series may be suitable for certain auxiliary applications.

Electrical inputs or outputs of machines covered by this standard may be as follows:

a) direct current (including rectified polyphase alternating current);
b) pulsating current (rectified single-phase alternating current);
c) unidirectional chopper-controlled current;
d) single-phase alternating current;
e) polyphase alternating current (in general three-phase).

In this standard, the electrical machines concerned are classified as follows.

1) Traction motors – Motors for propelling rail or road vehicles.
2) Engine-driven main generators – Generators for supplying power to traction motors on the same vehicle or train.
3) Main motor-generator sets – Machines obtaining power from a line or battery, and supplying power to traction motors on the same vehicle or train.
4) Auxiliary motors – Motors for driving compressors, fans, auxiliary generators or other auxiliary machines.
5) Auxiliary generators – Generators for supplying power for auxiliary services such as air conditioning, heating, lighting, battery charging, etc.

6) Auxiliary motor-generator sets and auxiliary rotary converters – Machines which obtain their power from the line or other source to provide an electrical supply for auxiliary services.

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.

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

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

IEC 60085, *Thermal evaluation and designation*

IEC 60638, *Criteria for assessing and coding of the commutation of rotating electrical machines for traction*

IEC 62498-1, *Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-131, IEC 60050-151, IEC 60050-411 and IEC 60050-811, as well as the following apply.

3.1
rating of a machine
combination of simultaneous values of electrical and mechanical quantities, with their duration and sequence, assigned to a machine by the manufacturer

3.1.1
rated value
numerical value of any quantity included in a rating

NOTE For traction machines, certain special quantities are often included such as current ripple factor for a pulsating current motor, excitation condition for a variable field motor, etc.

3.1.2
continuous rating
electrical load the machine can withstand on the test bed for an unlimited period under the conditions specified in 8.1 without exceeding the limits of temperature rise given in Table 2, all other appropriate requirements in this standard also being satisfied

3.1.2.1
continuous ratings of an engine-driven main generator
an engine-driven main generator normally has two continuous ratings which are defined below:

a) continuous rating "at lower voltage"

   continuous rating determined by the temperature rise of the windings through which the load current flows (higher value of load current and lower voltage)

b) continuous rating "at higher voltage"

continuous rating determined by the temperature rise of the field windings (lower value of load current and higher voltage)

NOTE 1 These two continuous ratings correspond to points on the full power regulated characteristic as defined in 3.8.2 or on the inherent characteristic as defined in 3.8.3.

NOTE 2 Ratings similar to those specified above may, where appropriate, be applied to a main motor-generator set.

3.1.3
short-time (for example, 1 h) rating
electrical load that a machine can withstand on the test bed for the stated time without exceeding the limits of temperature rise given in Table 2, the test being carried out as specified in 8.1 starting with the machine cold (see Clause A.1), all other appropriate requirements in this standard also being satisfied

3.1.4
short-time overload rating
electrical load that a machine can withstand on the test bed for the stated time without exceeding the limits of temperature rise given in Table 3 (the test being started and carried out as specified in Annex A)

NOTE Short-time overload ratings are of value in determining the suitability of machines for duties which involve relatively long periods of operation below the continuous rating followed by a period above it. These are most likely to occur in locomotive applications. They are not relevant to the repeated short-load cycles of rapid transit and similar duties and should not be specified for such applications.

3.1.5
intermittent duty rating

electrical loads and conditions at which a machine may be operated on a duty cycle without the temperature rises at any point in the cycle exceeding the limits given in Table 2

3.1.6
equivalent rating
continuous rating with constant values of voltage, current and speed that, as far as temperature rise is concerned, is equivalent to a long series of the intermittent duty cycles which the machine has to withstand in service

NOTE This rating should be agreed between user and manufacturer.

3.1.7
guaranteed rating
rating guaranteed by the manufacturer

3.1.7.1
guaranteed rating of a traction motor
the guaranteed rating is normally a continuous rating, but in special cases the manufacturer and user may agree that it is a short-time or intermittent rating

3.1.7.2
guaranteed ratings of an engine-driven main generator
the guaranteed ratings are normally the two continuous ratings defined in 3.1.2, but in special cases, the manufacturer and user may agree that they are short-time or intermittent ratings

3.1.7.3
guaranteed ratings of a main motor-generator set
the guaranteed ratings are normally the continuous rating, but in special cases, the manufacturer and user may agree that they are short-time or intermittent ratings

3.1.7.4
guaranteed rating of an auxiliary machine
unless otherwise specified, the guaranteed rating is the continuous rating