IEC 60349-2

Edition 3.0 2010-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electric traction – Rotating electrical machines for rail and road vehicles – Part 2: Electronic converter-fed alternating current motors

Traction électrique – Machines électriques tournantes des véhicules ferroviaires et routiers – Partie 2: Moteurs à courant alternatif alimentés par convertisseurs électroniques

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

Part 2: Electronic converter-fed alternating current motors

FOREWORD

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International Standard IEC 60349-2 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This third edition cancels and replaces the second edition published in 2002. 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, 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.

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

FDIS	Report on voting
9/1416/FDIS	9/1466/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- withdrawn,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.

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

Part 2: Electronic converter-fed alternating current motors

1 Scope and object

This part of IEC 60349 applies to converter-fed alternating current motors forming part of the equipment of electrically propelled rail and road vehicles.

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

Where further testing is to be undertaken in accordance with IEC 61377-1 and IEC 61377-3, it may be preferable, to avoid duplication, that some type and investigation tests be carried out on the combined test bed.

Particular attention is drawn to the need for collaboration between the designers of the motor and its associated converter as detailed in 5.1.

NOTE 1 This part also applies to motors installed on trailers hauled by powered vehicles.

NOTE 2 The basic requirements of this part may be applied to motors for special purpose vehicles such as mine locomotives but this part does not cover flameproof or other special features that may be required.

NOTE 3 It is not intended that this part should apply to motors on small road vehicles, such as battery-fed delivery vehicles, factory trucks, etc. This part also does not apply to minor machines such as windscreen wiper motors, etc. that may be used on all types of vehicles.

NOTE 4 Industrial type motors complying with IEC 60034 may be suitable for some auxiliary drives, providing that it is demonstrated that operation on a converter supply will meet the requirements of the particular application.

The rating of traction motors fed in parallel by a common converter has to take into account the effect on load-sharing of differences of wheel diameter and of motor characteristics as well as weight transfer when operating at high coefficients of adhesion. The user is to be informed of the maximum permissible difference in wheel diameter for the particular application.

The electrical input to motors covered by this part comes from an electronic converter.

NOTE 5 At the time of drafting, only the following combinations of motors and converters had been used for traction applications, but it may also apply to other combinations which may be used in the future:

– asynchronous motors fed by voltage source converters;

– asynchronous motors fed by current source converters;

– synchronous motors fed by current source converters.

The motors covered by this part are classified as follows:

a) Traction motors – Motors for propelling rail or road vehicles.

b) Auxiliary motors not covered by IEC 60034 – Motors for driving compressors, fans, auxiliary generators or other auxiliary machines.

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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 60034-9, *Rotating electrical machines – Part 9 – Noise limits*

IEC 60034-17, *Rotating electrical machines – Part 17: Cage induction motors when fed from convertors – Application guide*

IEC 60050-131, *International Electrotechnical Vocabulary – Part 131: Circuit theory*

IEC 60050-151, *International Electrotechnical Vocabulary – Part 151: Electrical and magnetic devices*

IEC 60050-411, *International Electrotechnical Vocabulary – Part 411: Rotating machinery*

IEC 60050-811, *International Electrotechnical Vocabulary – Part 811: Electric traction*

IEC 60085, *Thermal evaluation and designation*

IEC 61672, *Electroacoustics – Sound level meters*

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 motor
combination of simultaneous values of electrical and mechanical quantities, with their duration and sequence, assigned to the motor by the manufacturer

3.2
rated value
numerical value of any quantity included in a rating

3.3
continuous rating
mechanical output that the motor can deliver on the test bed for an unlimited time under the conditions specified in 8.1 without exceeding the limits of temperature rise given in Table 2, all other appropriate requirements in this part also being satisfied

NOTE Several continuous ratings may be specified.

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