



SLOVENSKI STANDARD
SIST EN 61377:1998
01-november-1998

Električna vleka – Vozna sredstva – Kombinirano preskušanje razsmerniško napajanih izmeničnih motorjev in njihovega krmiljenja

Electric traction - Rolling stock - Combined testing of inverter-fed alternating current motors and their control

Bahnanwendungen - Fahrzeuge - Kombinierte Prüfung von wechselrichtergespeisten Wechselstrommotoren und deren Steuerung

Traction électrique - Matériel roulant - Essais combinés de moteurs à courant alternatif alimentés par onduleur et de leur régulation

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Ta slovenski standard je istoveten z: EN 61377:1996

ICS:

29.160.30	Motorji	Motors
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61377

October 1996

ICS. 29.160.30; 29.280

English version

**Electric traction - Rolling stock - Combined testing of inverter-fed
alternating current motors and their control
(IEC 1377:1996)**

Traction électrique - Matériel roulant
Essais combinés de moteurs à courant
alternatif alimentés par onduleur et de
leur régulation
(CEI 1377:1996)

Zugförderung - Schienenfahrzeuge
Kombinierte Prüfung von
wechselrichtergespeisten
Wechselstrommotoren und deren
Steuerung
(IEC 1377:1996)

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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, 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 9/371/FDIS, future edition 1 of IEC 1377, prepared by IEC TC 9, Electric traction equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61377 on 1996-07-02.

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) 1997-04-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1997-04-01

Annexes designated "normative" are part of the body of the standard. In this standard, annexes A and ZA are normative. Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 1377:1996 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 50(411)	1973	International Electrotechnical Vocabulary Chapter 411: Rotating machines	-	-
IEC 50(551)	1982	Chapter 551: Power electronics	-	-
IEC 50(811)	1991	Chapter 811: Electric traction	-	-
IEC 349-2	1993	Electric traction - Rotating electrical machines for rail and road vehicles Part 2: Electronic converter-fed alternating current motors	ENV 60349-2 + corr. November 1993	1993
IEC 349-3	1995	Part 3: Determination of the total losses of converter-fed alternating current motors by summation of the component losses	-	-
IEC 571-1	1990	Electronic equipment used on rail vehicles Part 1: General requirements and tests for electronic equipment	-	-
IEC 571-2	1988	Part 2: Standardization of certain mechanical and electrical quantities Principles of test devices	-	-
IEC 571-3	1990	Part 3: Components, programmable electronic equipment and electronic system reliability	-	-
IEC 850	1988	Supply voltage of traction systems	-	-
IEC 1287-1	1995	Power convertors installed on board rolling stock Part 1: Characteristics and test methods	-	-

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC TRACTION –
ROLLING STOCK –Combined testing of inverter-fed alternating current
motors and their control

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 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. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 1377 has been prepared by IEC technical committee 9: Electric traction equipment.

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

FDIS	Report on voting
9/371/FDIS	9/380/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.

Annex A forms an integral part of this standard.

ELECTRIC TRACTION – ROLLING STOCK –

Combined testing of inverter-fed alternating current motors and their control

1 General

1.1 Scope and object

This International Standard applies to the combinations of motor(s), inverter and their control, and its object is to specify:

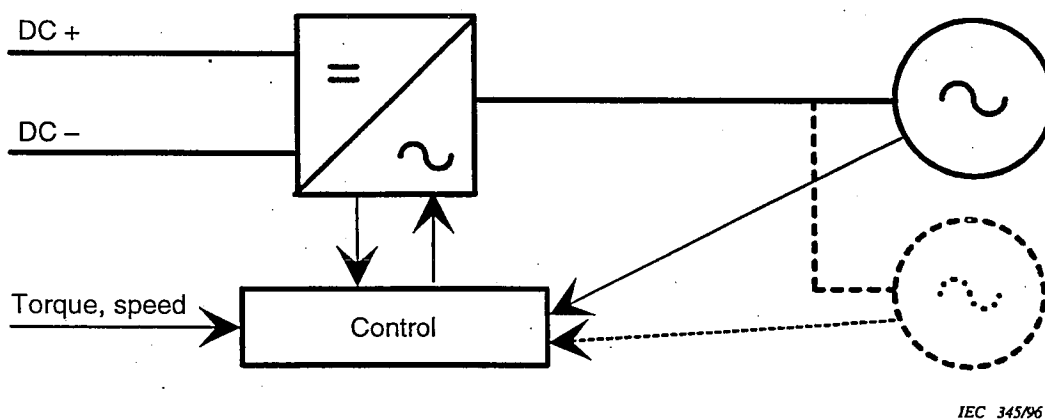
- the performance characteristics of electric drives consisting of an inverter, alternating current motors, and the related control system;
- methods of verifying these performance characteristics by tests.

Two categories of combined systems can be considered:

- 1) Motors fed from an inverter without any control between the mechanical output (torque, speed) and the inverter (mostly auxiliary motors, for example cooling fan motors). The motor works exactly as if it were fed from a busbar (at variable frequency and voltage or not).
- 2) Motor(s) (paralleled or not) with a control between the mechanical output and the inverter.

The first category of systems is tested according to IEC 349-2 and IEC 1287-1.

This standard applies to the second category, mainly traction drives.



IEC 345/96

Figure 1 – Traction drive

IEC 349-2 applies to convertor-fed alternating current motors, IEC 1287-1 to power electronic convertors; parts 1, 2 and 3 of IEC 571 apply to electronic equipments, this standard applies to the combination of motor(s), inverter, and their control. As a consequence, IEC 349-2 describes the tests to demonstrate the compliance of the motor to its specification, IEC 1287-1 does the same for the inverter. It is self-evident that some of the tests mentioned in this standard generally may replace the corresponding ones described in the above mentioned standards. An agreement should be reached between the parties to avoid the duplication of tests.

At the time of drafting this standard, only the following combinations of motors and inverters have 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 inverter;
- asynchronous motors fed by current source inverter;
- synchronous motors fed by current source inverter.

The d.c. source can be a supply line, a rectifier, a chopper, an input convertor, a diesel generator with integrated rectifiers, etc.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50(411): 1973, *International Electrotechnical Vocabulary (IEV) – Chapter 411: Rotating machines*

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IEC 50(551): 1982, *International Electrotechnical Vocabulary (IEV) – Chapter 551: Power electronics*

IEC 50(811): 1991, *International Electrotechnical Vocabulary (IEV) – Chapter 811: Electric traction*

IEC 349-2: 1993, *Electric traction – Rotating electrical machines for rail and road vehicles – Part 2: Electronic convertor-fed alternating current motors*

IEC 349-3: 1995, *Rail and road vehicles – Determination of the total losses of convertor-fed alternating current motors by summation of the component losses*

IEC 571-1: 1990, *Electronic equipment used on rail vehicles – Part 1: General requirements and tests for electronic equipment*