SLOVENSKI STANDARD

SIST EN 61800-5-1:2004

september 2004

Električni pogonski sistemi z nastavljivo hitrostjo - 5-1. del: Varnostne zahteve - Električne, toplotne in energijske (IEC 61800-5-1:2003)

Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy (IEC 61800-5-1:2003)

ICS 29.160.30; 29.200

Referenčna številka
SIST EN 61800-5-1:2004(en)

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61800-5-1

April 2003

ICS 29.130

English version

Adjustable speed electrical power drive systems Part 5-1: Safety requirements - Electrical, thermal and energy

(IEC 61800-5-1:2003)

Entraînements électriques de puissance à vitesse variable
Partie 5-1: Exigences de sécurité - Electrique, thermique et énergétique
(CEI 61800-5-1:2003)

Elektrische Leistungsantriebssysteme mit einstellbarer Drehzahl
Teil 5-1: Anforderungen an die Sicherheit - Elektrische, thermische und energetische Anforderungen
(IEC 61800-5-1:2003)

This European Standard was approved by CENELEC on 2003-03-01. 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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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 22G/108/FDIS, future edition 1 of IEC 61800-5-1, prepared by SC 22G, Semiconductor power converters for adjustable speed electric drive systems, of IEC TC 22, Power electronic systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61800-5-1 on 2003-03-01.

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) 2003-12-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-03-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes C and ZA are normative and annexes A, B, D and E are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61800-5-1:2003 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 61082	NOTE	Harmonized as EN 61082 series (not modified).
IEC 62079	NOTE	Harmonized as EN 62079:2001 (not modified).

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.

Publication	Year	Title	EN/HD	Year
IEC 60034	Series	Rotating electrical machines	EN 60034	Series
IEC 60050-111	- [1)]	International Electrotechnical Vocabulary (IEV) Chapter 111: Physics and chemistry	-	-
IEC 60050-151	- [1)]	Part 151: Electrical and magnetic devices	-	-
IEC 60050-161	- [1)]	Chapter 161: Electromagnetic compatibility	-	-
IEC 60050-191	- [1)]	Chapter 191: Dependability and quality of service	-	-
IEC 60050-441	- [1)]	Chapter 441: Switchgear, controlgear and fuses	-	-
IEC 60050-442	- [1)]	Part 442: Electrical accessories	-	-
IEC 60050-551	- [1)]	Part 551: Power electronics	-	-
IEC 60050-601	- [1)]	Chapter 601: Generation, transmission and distribution of electricity - General	-	-
IEC 60060-1 + corr. March	1989 1990	High-voltage test techniques Part 1: General definitions and test requirements	HD 588.1 S1	1991
IEC 60071-1	1993	Insulation co-ordination Part 1: Definitions, principles and rules	EN 60071-1	1995
IEC 60071-2	1996	Part 2: Application guide	EN 60071-2	1997

1) Undated reference.

Publication	Year	Title	EN/HD	Year
IEC 60112	1979	Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions	HD 214 S2 [2)]	1980
IEC 60204-11	2000	Safety of machinery - Electrical equipment of machines Part 11: Requirements for HV equipment for voltages above 1 000 V a.c. or 1 500 V d.c. and not exceeding 36 kV	EN 60204-11	2000
IEC 60249-1	1982	Base materials for printed circuits Part 1: Test methods	EN 60249-1 [3)]	1993
IEC 60364-1	2001	Electrical installations of buildings Part 1: Fundamental principles, assessment of general characteristics, definitions	-	-
IEC 60417	Series	Graphical symbols for use on equipment	EN 60417	Series
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60617	Series	Graphical symbols for diagrams	EN 60617	Series
IEC 60664-1	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	EN 60664-1 [4)]	2003
IEC 60664-3	1992	Part 3: Use of coatings to achieve insulation coordination of printed board assemblies	HD 625.3 S1 [5)]	1997
IEC 60695-2-10	2000	Fire hazard testing Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	EN 60695-2-10	2001
IEC 60695-2-11	2000	Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	2001
IEC 60695-2-12	2000	Part 2-12: Glowing/hot-wire based test methods - Glow-wire flammability test method for materials	EN 60695-2-12	2001

2) HD 214 S2 is superseded by EN 60112:2003, which is based on IEC 60112:2003.

3) EN 60249-1 includes A1:1984 + A2:1989 + A3:1991 to IEC 60249-1.

4) EN 60664-1 includes A1:2000 + A2:2002 to IEC 60664-1.

5) HD 625.3 S1 is superseded by EN 60664-3:2003, which is based on IEC 60664-3:2003.

Publication	Year	Title	EN/HD	Year
IEC 60695-2-13	2000	Part 2-13: Glowing/hot-wire based test methods - Glow-wire ignitability test method for materials	EN 60695-2-13	2001
IEC 60695-11-10	1999	Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	1999
IEC 60695-11-20	1999	Part 11-20: Test flames - 500 W flame test methods	EN 60695-11-20	1999
IEC 60707	1999	Flammability of solid non-metallic materials when exposed to flame sources - List of test methods	EN 60707	1999
IEC/TR 60755	1983	General requirements for residual current operated protective devices	-	-
IEC 60947-7-1	2002	Low-voltage switchgear and controlgear Part 7-1: Ancillary equipment - Terminal blocks for copper conductors	EN 60947-7-1	2002
IEC 60947-7-2	2002	Part 7-2: Ancillary equipment - Protective conductor terminal blocks for copper conductors	EN 60947-7-2	2002
IEC 60990	1999	Methods of measurement of touch current and protective conductor current	EN 60990	1999
IEC 61800-1	1997	Adjustable speed electrical power drive systems Part 1: General requirements - Rating specifications for low voltage adjustable speed d.c. power drive systems	EN 61800-1	1998
IEC 61800-2	1998	Part 2: General requirements - Rating specifications for low voltage adjustable frequency a.c. power drive systems	EN 61800-2	1998
IEC 61800-3	1996	Part 3: EMC product standard including specific test methods	EN 61800-3 A11	1996 2000
IEC 61800-4	2002	Part 4: General requirements - Rating specifications for a.c. power drive systems above 1 000 V a.c. and not exceeding 35 kV	EN 61800-4	2003
ISO 3864	1984	Safety colours and safety signs	-	-

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
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Première édition
First edition
2003-02

Entraînements électriques de puissance à vitesse variable –

Partie 5-1: Exigences de sécurité – Electrique, thermique et énergétique

Adjustable speed electrical power drive systems –

Part 5-1: Safety requirements – Electrical, thermal and energy

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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For price, see current catalogue

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 5-1: Safety requirements – Electrical, thermal and energy

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 61800-5-1 has been prepared by subcommittee 22G: Semi-conductor power converters for adjustable speed electric drive systems, of IEC technical committee 22: Power electronic systems and equipment.

The text of this part of IEC 61800 is based on the following documents:

FDIS	Report on voting
22G/108/FDIS	22G/110/RVD

Full information on the voting for the approval of this part of IEC 61800 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 committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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

The contents of the corrigendum of September 2003 have been included in this copy.

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 5-1: Safety requirements – Electrical, thermal and energy

1 Scope

This part of IEC 61800 specifies requirements for adjustable speed power drive systems, or their elements, with respect to electrical, thermal and energy safety considerations. It does not cover the driven equipment except for interface requirements. It applies to adjustable speed electric drive systems which include the power conversion, drive control, and motor or motors. Excluded are traction and electric vehicle drives. It applies to d.c. drive systems connected to line voltages up to 1 kV a.c., 50 Hz or 60 Hz and a.c. drive systems with converter input or output voltages up to 35 kV, 50 Hz or 60 Hz.

Rating specifications for d.c. power drive systems connected to line voltages up to 1 kV a.c. are covered in IEC 61800-1.

Rating specifications for a.c. power drive systems with converter input or output voltages up to 1 kV a.c. are covered in IEC 61800-2.

EMC aspects are covered in IEC 61800-3.

Rating specifications for a.c. power drive systems with converter input or output voltages greater than 1 kV a.c. and up to 35 kV a.c. are covered in IEC 61800-4.

The scope of this part of IEC 61800 does not include devices used as component parts of a PDS if they comply with the safety requirements of a relevant product standard for the same environment.

NOTE 1 In some cases, safety requirements of the overall PDS (for example, protection against direct contact) can necessitate the use of special components and/or additional measures.

NOTE 2 For the purposes of this International Standard, energy hazards can be, for example, explosion of components or stored energy in capacitors.

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 (all parts), *Rotating electrical machines*

IEC 60050(111), *International Electrotechnical Vocabulary – Chapter 111: Physics and chemistry*

IEC 60050(151), *International Electrotechnical Vocabulary – Chapter 151: Electrical and magnetic devices*

IEC 60050(161), *International Electrotechnical Vocabulary – Chapter 161: Electromagnetic compatibility*

IEC 60050(191), *International Electrotechnical Vocabulary – Chapter 191: Dependability and quality of service*

IEC 60050(441), *International Electrotechnical Vocabulary – Chapter 441: Switchgear, controlgear and fuses*

IEC 60050(442), *International Electrotechnical Vocabulary – Part 442: Electrical accessories*

IEC 60050(551), *International Electrotechnical Vocabulary – Part 551: Power electronics*

IEC 60050(601), *International Electrotechnical Vocabulary – Chapter 601: Generation, transmission and distribution of electricity – General*

IEC 60060-1:1989, *High-voltage test techniques. Part 1: General definitions and test requirements*

IEC 60071-1:1993, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60071-2:1996, *Insulation co-ordination – Part 2: Application guide*

IEC 60112:1979, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*

IEC 60204-11:2000, *Safety of machinery – Electrical equipment of machines – Part 11: Requirements for HV equipment for voltages above 1 000V a.c. or 1 500V d.c. and not exceeding 36 kV*

IEC 60249-1:1982, *Base materials for printed circuits – Part 1: Test methods*

IEC 60364-1:2001, *Electrical installations of buildings – Part 1: Fundamental principles, assessment of general characteristics, definitions*

IEC 60417 (all parts), *Graphical symbols for use on equipment*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*[1]

IEC 60617: *Graphical symbols for diagrams*

IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*[2]

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1 There is a consolidated edition 2.1 (2001) that includes edition 2.0 and its Amendment 1.

2 There is a consolidated edition 1.2 (2002) that includes edition 1.0 and its Amendments 1 and 2.

IEC 60664-3:1992, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coatings to achieve insulation coordination of printed board assemblies*

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammabiliy test method for end products*

IEC 60695-2-12:2000, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability test method for materials*

IEC 60695-2-13:2000, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignitability test method for materials*

IEC 60695-11-10:1999, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60695-11-20:1999, *Fire hazard testing – Part 11-20: Test flames – 500 W flame test methods*

IEC 60707:1999, *Flammability of solid non-metallic materials when exposed to flame sources – List of test methods*

IEC 60755:1983, *General requirements for residual current operated protective devices*

IEC 60947-7-1:2002 *Low-voltage switchgear and control gear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors*

IEC 60947-7-2:2002, *Low-voltage switchgear and controlgear – Part 7-2: Ancillary equipment – Protective conductor terminal blocks for copper conductors*

IEC 60990:1999, *Methods of measurement of touch current and protective conductor current*

IEC 61800-1:1997, *Adjustable speed electrical power drive systems – Part 1: General requirements – Rating specifications for low voltage adjustable speed d.c. power drive systems*

IEC 61800-2:1998, *Adjustable speed electrical power drive systems – Part 2: General requirements – Rating specifications for low voltage adjustable frequency a.c. power drive systems*

IEC 61800-3:1996, *Adjustable speed electrical power drive systems – Part 3: EMC product standard including specific test methods*

IEC 61800-4:2002, *Adjustable speed electrical power drive systems – Part 4: General requirements – Rating specifications for a.c. power drive systems above 1 000 V and not exceeding 35 kV*

ISO 3864:1984, *Safety colours and safety signs*