

**Reguleeritava kiirusega  
elektriajamisüsteemid. Osa 5-1:  
Ohutusnõuded. Elektrilised, soojuslikud  
ja energeetilised nõuded**

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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

|                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                   |
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| <p>Käesolev Eesti standard EVS-EN 61800-5-1:2007 sisaldab Euroopa standardi EN 61800-5-1:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 23.11.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p> | <p>This Estonian standard EVS-EN 61800-5-1:2007 consists of the English text of the European standard EN 61800-5-1:2007.</p> <p>This document is endorsed on 23.11.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p> |
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| <p><b>Käsitlusala:</b></p> <p>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 voltages up to 35 kV, 50 Hz or 60 Hz and output voltages up to 35 kV.</p> | <p><b>Scope:</b></p> <p>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 voltages up to 35 kV, 50 Hz or 60 Hz and output voltages up to 35 kV.</p> |
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ICS 29.130

Võtmesõnad:

English version

**Adjustable speed electrical power drive systems -  
Part 5-1: Safety requirements -  
Electrical, thermal and energy  
(IEC 61800-5-1:2007)**

Entraînements électriques de puissance  
à vitesse variable -  
Partie 5-1: Exigences de sécurité -  
Electrique, thermique et énergétique  
(CEI 61800-5-1:2007)

Elektrische Leistungsantriebssysteme  
mit einstellbarer Drehzahl -  
Teil 5-1: Anforderungen  
an die Sicherheit -  
Elektrische, thermische  
und energetische Anforderungen  
(IEC 61800-5-1:2007)

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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/178/FDIS, future edition 2 of IEC 61800-5-1, prepared by SC 22G, Adjustable speed electric drive systems incorporating semiconductor power converters, 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 2007-08-01.

This European Standard supersedes EN 61800-5-1:2003.

The major areas of change in EN 61800-5-1:2007 are the following:

- addition of alphabetical Table 1 in Clause 3;
- addition of Table 2 in 4.1 for relevance to PDS/CDM/BDM;
- addition of Table 4 summary of decisive voltage class requirements;
- expansion of subclause on protective bonding (4.3.5.3);
- clarification of distinction between touch current and protective conductor current;
- revision of section on insulation (now 4.3.6) to include solid insulation;
- addition of overvoltage categories I and II to HV insulation voltage;
- revision of section on Solid insulation (now 4.3.6.8);
- addition of high-frequency insulation requirements (4.3.6.9, Annex E);
- addition of requirements for liquid-cooled PDS (4.4.5);
- addition of climatic and vibration tests (5.2.6);
- clarification of voltage test procedure to avoid over-stress of basic insulation (5.2.3.2.3);
- revision of short-circuit test requirement for large, high-voltage and one-off PDS (now 5.2.3.6);
- addition of informative Annex B for overvoltage category reduction.

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) | 2008-05-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn                                               | (dow) | 2010-08-01 |

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 61800-5-1:2007 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 60034-9    | NOTE Harmonized as EN 60034-9:2005 (modified).                                               |
| IEC 60071      | NOTE Harmonized in EN 60071 series (not modified).                                           |
| IEC 60071-1    | NOTE Harmonized as EN 60071-1:2006 (not modified).                                           |
| IEC 60071-2    | NOTE Harmonized as EN 60071-2:1997 (not modified).                                           |
| IEC 60146-1-1  | NOTE Harmonized as EN 60146-1-1:1993 (not modified).                                         |
| IEC 60309-1    | NOTE Harmonized as EN 60309-1:1999 (not modified).                                           |
| IEC 60364-4-44 | NOTE Amendment 1:2003 to IEC 60364-4-44:2001 is harmonized as HD 60364-4-443:2006 (modified) |
| IEC 60664      | NOTE Harmonized in EN 60664 series (not modified).                                           |
| IEC 60695-2-11 | NOTE Harmonized as EN 60695-2-11:2001 (not modified).                                        |
| IEC 60695-2-12 | NOTE Harmonized as EN 60695-2-12:2001 (not modified).                                        |
| IEC 60721      | NOTE Harmonized in EN 60721 series (not modified).                                           |
| IEC 61082      | NOTE Harmonized in EN 61082 series (not modified).                                           |
| IEC 61140      | NOTE Harmonized as EN 61140:2002 (not modified).                                             |
| IEC 61180-1    | NOTE Harmonized as EN 61180-1:1994 (not modified).                                           |
| IEC 61189-2    | NOTE Harmonized as EN 61189-2:2006 (not modified).                                           |
| IEC 61643-12   | NOTE Harmonized as CLC/TS 61643-12:2006 (modified).                                          |
| IEC 61800-3    | NOTE Harmonized as EN 61800-3:2004 (not modified).                                           |
| IEC 62079      | NOTE Harmonized as EN 62079:2001 (not modified).                                             |

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## 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.

| <u>Publication</u> | <u>Year</u>     | <u>Title</u>                                                                                                                                                     | <u>EN/HD</u> | <u>Year</u>        |
|--------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------|
| IEC 60034          | Series          | Rotating electrical machines                                                                                                                                     | EN 60034     | Series             |
| IEC 60034-1        | - <sup>1)</sup> | Rotating electrical machines -<br>Part 1: Rating and performance                                                                                                 | EN 60034-1   | 2004 <sup>2)</sup> |
| IEC 60034-5        | - <sup>1)</sup> | Rotating electrical machines -<br>Part 5: Degrees of protection provided by the<br>integral design of rotating electrical machines<br>(IP code) - Classification | EN 60034-5   | 2001 <sup>2)</sup> |
| IEC 60050-111      | - <sup>1)</sup> | International Electrotechnical Vocabulary<br>(IEV) -<br>Chapter 111: Physics and chemistry                                                                       | -            | -                  |
| IEC 60050-151      | - <sup>1)</sup> | International Electrotechnical Vocabulary<br>(IEV) -<br>Part 151: Electrical and magnetic devices                                                                | -            | -                  |
| IEC 60050-161      | - <sup>1)</sup> | International Electrotechnical Vocabulary<br>(IEV) -<br>Chapter 161: Electromagnetic compatibility                                                               | -            | -                  |
| IEC 60050-191      | - <sup>1)</sup> | International Electrotechnical Vocabulary<br>(IEV) -<br>Chapter 191: Dependability and quality of<br>service                                                     | -            | -                  |
| IEC 60050-441      | - <sup>1)</sup> | International Electrotechnical Vocabulary<br>(IEV) -<br>Chapter 441: Switchgear, controlgear and<br>fuses                                                        | -            | -                  |
| IEC 60050-442      | - <sup>1)</sup> | International Electrotechnical Vocabulary<br>(IEV) -<br>Part 442: Electrical accessories                                                                         | -            | -                  |
| IEC 60050-551      | - <sup>1)</sup> | International Electrotechnical Vocabulary<br>(IEV) -<br>Part 551: Power electronics                                                                              | -            | -                  |
| IEC 60050-601      | - <sup>1)</sup> | International Electrotechnical Vocabulary<br>(IEV) -<br>Chapter 601: Generation, transmission and<br>distribution of electricity - General                       | -            | -                  |

<sup>1)</sup> Undated reference.

<sup>2)</sup> Valid edition at date of issue.

| <u>Publication</u>          | <u>Year</u>          | <u>Title</u>                                                                                                                                                                                   | <u>EN/HD</u>               | <u>Year</u>        |
|-----------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------|
| IEC 60060-1                 | 1989                 | High-voltage test techniques -<br>Part 1: General definitions and test<br>requirements                                                                                                         | HD 588.1 S1                | 1991               |
| IEC 60068-2-2               | 1974                 | Environmental testing -<br>Part 2: Tests - Tests B: Dry heat                                                                                                                                   | EN 60068-2-2 <sup>3)</sup> | 1993               |
| IEC 60068-2-6               | - <sup>1)</sup>      | Environmental testing -<br>Part 2: Tests - Test Fc: Vibration (sinusoidal)                                                                                                                     | EN 60068-2-6               | 1995 <sup>2)</sup> |
| IEC 60068-2-78              | - <sup>1)</sup>      | Environmental testing -<br>Part 2-78: Tests - Test Cab: Damp heat,<br>steady state                                                                                                             | EN 60068-2-78              | 2001 <sup>2)</sup> |
| IEC 60112                   | 2003                 | Method for the determination of the proof<br>and the comparative tracking indices of solid<br>insulating materials                                                                             | EN 60112                   | 2003               |
| IEC 60204-11                | - <sup>1)</sup>      | Safety of machinery - Electrical equipment<br>of machines -<br>Part 11: Requirements for HV equipment for<br>voltages above 1 000 V a.c. or 1 500 V d.c.<br>and not exceeding 36 kV            | EN 60204-11                | 2000               |
| IEC 60309 (mod)             | Series               | Plugs, socket-outlets and couplers for<br>industrial purposes                                                                                                                                  | EN 60309                   | Series             |
| IEC 60364-1 (mod)           | - <sup>1)</sup>      | Low-voltage electrical installations -<br>Part 1: Fundamental principles, assessment<br>of general characteristics, definitions                                                                | - <sup>4)</sup>            | -                  |
| IEC 60364-5-54<br>(mod)     | 2002                 | Electrical installations of buildings -<br>Part 5-54: Selection and erection of electrical<br>equipment - Earthing arrangements,<br>protective conductors and protective bonding<br>conductors | HD 60364-5-54              | 2007               |
| IEC 60417                   | Data-<br>base        | Graphical symbols for use on equipment                                                                                                                                                         | -                          | -                  |
| IEC 60529                   | 1989                 | Degrees of protection provided by enclosures<br>(IP Code)                                                                                                                                      | EN 60529<br>+ corr. May    | 1991<br>1993       |
| IEC 60617                   | Data-<br>base        | Graphical symbols for diagrams                                                                                                                                                                 | -                          | -                  |
| IEC 60664-1<br>+ A1<br>+ A2 | 1992<br>2000<br>2002 | Insulation coordination for equipment within<br>low-voltage systems -<br>Part 1: Principles, requirements and tests                                                                            | EN 60664-1 <sup>5)</sup>   | 2003               |
| IEC 60664-3                 | 2003                 | Insulation coordination for equipment within<br>low-voltage systems -<br>Part 3: Use of coating, potting or moulding for<br>protection against pollution                                       | EN 60664-3                 | 2003               |

<sup>3)</sup> EN 60068-2-2 includes supplement A:1976 to IEC 60068-2-2.

<sup>4)</sup> IEC 60364-1:2005 (modified) will be submitted to formal vote for acceptance as HD 60364-1.

<sup>5)</sup> EN 60664-1 is superseded by EN 60664-1:2007, which is based on IEC 60664-1:2007.

| <u>Publication</u> | <u>Year</u>     | <u>Title</u>                                                                                                                                                                   | <u>EN/HD</u>               | <u>Year</u>                |
|--------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|
| IEC 60664-4        | 2005            | Insulation coordination for equipment within low-voltage systems - Part 4: Consideration of high-frequency voltage stress                                                      | EN 60664-4 + corr. October | 2006<br>2006               |
| IEC 60695-2-10     | - <sup>1)</sup> | Fire hazard testing - Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure                                                           | EN 60695-2-10              | 2001 <sup>2)</sup>         |
| IEC 60695-2-13     | - <sup>1)</sup> | Fire hazard testing - Part 2-13: Glowing/hot-wire based test methods - Glow-wire ignitability test method for materials                                                        | EN 60695-2-13              | 2001 <sup>2)</sup>         |
| IEC 60695-11-10    | - <sup>1)</sup> | Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods                                                                                | EN 60695-11-10             | 1999 <sup>2)</sup>         |
| IEC 60695-11-20    | - <sup>1)</sup> | Fire hazard testing - Part 11-20: Test flames - 500 W flame test methods                                                                                                       | EN 60695-11-20             | 1999 <sup>2)</sup>         |
| IEC/TR 60755       | - <sup>1)</sup> | 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            | Low-voltage switchgear and controlgear - 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 61230 (mod)    | - <sup>1)</sup> | Live working - Portable equipment for earthing or earthing and short-circuiting                                                                                                | EN 61230 +A11              | 1995 <sup>2)</sup><br>1999 |
| IEC 61800-1        | - <sup>1)</sup> | 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 <sup>2)</sup>         |
| IEC 61800-2        | - <sup>1)</sup> | Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency a.c. power drive systems           | EN 61800-2                 | 1998 <sup>2)</sup>         |
| IEC 61800-4        | - <sup>1)</sup> | Adjustable speed electrical power drive systems - 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 <sup>2)</sup>         |
| IEC 62020          | - <sup>1)</sup> | Electrical accessories - Residual current monitors for household and similar uses (RCMs)                                                                                       | -                          | -                          |

| <u>Publication</u> | <u>Year</u>     | <u>Title</u>                                                                                                      | <u>EN/HD</u>                  | <u>Year</u>                |
|--------------------|-----------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------|
| IEC 62271-102      | - <sup>1)</sup> | High-voltage switchgear and controlgear -<br>Part 102: Alternating current disconnectors<br>and earthing switches | EN 62271-102<br>+ corr. March | 2002 <sup>2)</sup><br>2005 |
| ISO 3864           | Series          | Graphical symbols - Safety colours and safety -<br>signs                                                          |                               | -                          |
| ISO 7000           | 2004            | Graphical symbols for use on equipment -<br>Index and synopsis                                                    | -                             | -                          |

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**61800-5-1**

Second edition  
Deuxième édition  
2007-07

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**Adjustable speed electrical  
power drive systems –**

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

**Entraînements électriques de  
puissance à vitesse variable –**

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



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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## CONTENTS

|                                                                                                              |     |
|--------------------------------------------------------------------------------------------------------------|-----|
| FOREWORD.....                                                                                                | 5   |
| 1 Scope.....                                                                                                 | 7   |
| 2 Normative references.....                                                                                  | 7   |
| 3 Terms and definitions .....                                                                                | 10  |
| 4 Protection against electric shock, thermal, and energy hazards .....                                       | 16  |
| 4.1 General .....                                                                                            | 16  |
| 4.2 Fault conditions .....                                                                                   | 17  |
| 4.3 Protection against electric shock.....                                                                   | 18  |
| 4.4 Protection against thermal hazards .....                                                                 | 51  |
| 4.5 Protection against energy hazards .....                                                                  | 56  |
| 4.6 Protection against environmental stresses .....                                                          | 57  |
| 5 Test requirements.....                                                                                     | 57  |
| 5.1 General .....                                                                                            | 57  |
| 5.2 Test specifications.....                                                                                 | 60  |
| 6 Information and marking requirements .....                                                                 | 82  |
| 6.1 General .....                                                                                            | 82  |
| 6.2 Information for selection .....                                                                          | 85  |
| 6.3 Information for installation and commissioning .....                                                     | 85  |
| 6.4 Information for use .....                                                                                | 89  |
| 6.5 Information for maintenance .....                                                                        | 91  |
| Annex A (informative) Examples of protection in case of direct contact .....                                 | 93  |
| Annex B (informative) Examples of overvoltage category reduction.....                                        | 95  |
| Annex C (normative) Measurement of clearance and creepage distances .....                                    | 101 |
| Annex D (informative) Altitude correction for clearances .....                                               | 107 |
| Annex E (informative) Clearance and creepage distance determination for frequencies greater than 30 kHz..... | 109 |
| Annex F (informative) Cross-sections of round conductors.....                                                | 112 |
| Annex G (informative) Guidelines for RCD compatibility.....                                                  | 113 |
| Annex H (informative) Symbols referred to in this part of IEC 61800 .....                                    | 116 |
| Bibliography .....                                                                                           | 117 |
| Figure 1 – <i>PDS</i> hardware configuration within an <i>installation</i> .....                             | 16  |
| Figure 2 – Typical waveform for a.c. <i>working voltage</i> .....                                            | 19  |
| Figure 3 – Typical waveform for d.c. <i>working voltage</i> .....                                            | 20  |
| Figure 4 – Typical waveform for pulsating <i>working voltage</i> .....                                       | 20  |
| Figure 5 – Examples for protection against direct contact .....                                              | 22  |
| Figure 6 – Example of <i>protective bonding</i> .....                                                        | 26  |
| Figure 7 – Voltage limits under fault conditions .....                                                       | 28  |
| Figure 8 – Voltage test procedures .....                                                                     | 68  |
| Figure 9 – Circuit for high-current arcing test.....                                                         | 77  |

|                                                                                                                                                                          |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Figure 10 – Test fixture for hot-wire ignition test .....                                                                                                                | 78  |
| Figure A.1 – Protection by <i>DVC A</i> , with <i>protective separation</i> .....                                                                                        | 93  |
| Figure A.2 – Protection by means of <i>protective impedance</i> .....                                                                                                    | 94  |
| Figure A.3 – Protection by using limited voltages .....                                                                                                                  | 94  |
| Figure B.1 – <i>Basic insulation</i> evaluation for circuits connected directly to the origin of the <i>installation</i> supply mains.....                               | 95  |
| Figure B.2 – <i>Basic insulation</i> evaluation for circuits connected directly to the supply mains.....                                                                 | 96  |
| Figure B.3 – <i>Basic insulation</i> evaluation for equipment not permanently connected to the supply mains.....                                                         | 96  |
| Figure B.4 – <i>Basic insulation</i> evaluation for circuits connected directly to the origin of the <i>installation</i> supply mains where internal SPDs are used ..... | 96  |
| Figure B.5 – <i>Basic insulation</i> evaluation for circuits connected directly to the supply mains where internal SPDs are used .....                                   | 97  |
| Figure B.6 – Example of <i>protective separation</i> evaluation for circuits connected directly to the supply mains where internal SPDs are used.....                    | 97  |
| Figure B.7 – Example of <i>protective separation</i> evaluation for circuits connected directly to the supply mains where internal SPDs are used.....                    | 97  |
| Figure B.8 Example of <i>protective separation</i> evaluation for circuits connected directly to the supply mains where internal SPDs are used.....                      | 98  |
| Figure B.9 – <i>Basic insulation</i> evaluation for circuits not connected directly to the supply mains.....                                                             | 98  |
| Figure B.10 – <i>Basic insulation</i> evaluation for circuits not connected directly to the supply mains.....                                                            | 98  |
| Figure B.11 – <i>Functional insulation</i> evaluation within circuits affected by external transients.....                                                               | 99  |
| Figure B.12 – <i>Basic insulation</i> evaluation for circuits both connected and not connected directly to the supply mains .....                                        | 99  |
| Figure B.13 – Insulation evaluation for accessible circuit of <i>DVC A</i> .....                                                                                         | 100 |
| Figure G.1 – Flow chart leading to selection of the RCD/RCM type upstream of a <i>PDS</i> .....                                                                          | 113 |
| Figure G.2 – Fault current waveforms in connections with semiconductor devices.....                                                                                      | 114 |
| Table 1 – Alphabetical list of terms .....                                                                                                                               | 10  |
| Table 2 – Relevance of requirements to <i>PDS/CDM/BDM</i> .....                                                                                                          | 17  |
| Table 3 – Summary of the limits of the <i>decisive voltage classes</i> .....                                                                                             | 18  |
| Table 4 – Protection requirements for considered circuit.....                                                                                                            | 19  |
| Table 5 – <i>Protective earthing conductor</i> cross-section .....                                                                                                       | 28  |
| Table 6 – Definitions of pollution degrees .....                                                                                                                         | 31  |
| Table 7 – Insulation voltage for low voltage circuits.....                                                                                                               | 33  |
| Table 8 – Insulation voltage for high voltage circuits .....                                                                                                             | 33  |
| Table 9 – Clearance distances .....                                                                                                                                      | 37  |
| Table 10 – Creepage distances (mm) .....                                                                                                                                 | 39  |
| Table 11 – Thickness of sheet metal for enclosures: carbon steel or stainless steel.....                                                                                 | 45  |
| Table 12 – Thickness of sheet metal for enclosures: aluminium, copper or brass .....                                                                                     | 46  |
| Table 13 – Wire bending space from terminals to enclosure .....                                                                                                          | 49  |
| Table 14 – Generic materials for the direct support of uninsulated <i>live parts</i> .....                                                                               | 52  |
| Table 15 – Maximum measured temperatures for internal materials and components.....                                                                                      | 54  |

|                                                                                                                                              |     |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Table 16 – Maximum measured temperatures for external parts of the <i>CDM</i> .....                                                          | 55  |
| Table 17 – Test overview .....                                                                                                               | 59  |
| Table 18 – Impulse voltage test .....                                                                                                        | 63  |
| Table 19 – Impulse test voltage for <i>low-voltage PDS</i> .....                                                                             | 64  |
| Table 20 – Impulse test voltage for <i>high-voltage PDS</i> .....                                                                            | 64  |
| Table 21 – A.C. or d.c. test voltage for circuits connected directly to low voltage mains .....                                              | 65  |
| Table 22 – A.C. or d.c. test voltage for circuits connected directly to high voltage mains .....                                             | 66  |
| Table 23 – A.C. or d.c. test voltage for circuits not connected directly to the mains .....                                                  | 67  |
| Table 24 – Partial discharge test .....                                                                                                      | 70  |
| Table 25 – Dry heat test (steady state) .....                                                                                                | 80  |
| Table 26 – Damp heat test (steady state) .....                                                                                               | 81  |
| Table 27 – Vibration test .....                                                                                                              | 82  |
| Table 28 – Information requirements .....                                                                                                    | 84  |
| Table C.1 – Width of grooves by pollution degree .....                                                                                       | 101 |
| Table D.1 – Correction factor for clearances at altitudes between 2 000 m and 20 000 m<br>(see 4.3.6.4.1) .....                              | 107 |
| Table D.2 – Test voltages for verifying clearances at different altitudes .....                                                              | 107 |
| Table E.1 – Minimum values of clearances in air at atmospheric pressure for<br>inhomogeneous field conditions (Table 1 of IEC 60664-4) ..... | 110 |
| Table E.2 – Minimum values of creepage distances for different frequency ranges<br>(Table 2 of IEC 60664-4) .....                            | 111 |
| Table F.1 – Standard cross-sections of round conductors .....                                                                                | 112 |
| Table H.1 – Symbols used .....                                                                                                               | 116 |

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –****Part 5-1: Safety requirements –  
Electrical, thermal and energy**

## FOREWORD

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

This second edition cancels and replaces the first edition published in 2003. It constitutes a technical revision.

The major areas of change in this edition are the following:

- a) addition of alphabetical Table 1 in Clause 3;
- b) addition of Table 2 in 4.1 for relevance to PDS/CDM/BDM;
- c) addition of Table 4 summary of decisive voltage class requirements;
- d) expansion of subclause on protective bonding (4.3.5.3);

- e) clarification of distinction between touch current and protective conductor current;
- f) revision of section on insulation (now 4.3.6) to include solid insulation;
- g) addition of overvoltage categories I and II to HV insulation voltage;
- h) revision of section on Solid insulation (now 4.3.6.8)
- i) addition of high-frequency insulation requirements (4.3.6.9, Annex E);
- j) addition of requirements for liquid-cooled PDS (4.4.5);
- k) addition of climatic and vibration tests (5.2.6);
- l) clarification of voltage test procedure to avoid over-stress of basic insulation (5.2.3.2.3);
- m) revision of short-circuit test requirement for large, high-voltage and one-off PDS (now 5.2.3.6);
- n) addition of informative Annex B for overvoltage category reduction.

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

| FDIS         | Report on voting |
|--------------|------------------|
| 22G/178/FDIS | 22G/181/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.

A list of all parts of the IEC 61800 series, published under the general title *Adjustable speed electrical power drive systems*, can be found on the IEC website.

Terms in *italics* in the text are defined in Clause 3.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

## 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 voltages up to 35 kV, 50 Hz or 60 Hz and output voltages up to 35 kV.

Other parts of IEC 61800 cover rating specifications, EMC, functional safety, etc.

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. For example, motors used in *PDS* shall comply with the relevant parts of IEC 60034.

Unless specifically stated, the requirements of this International Standard apply to all parts of the *PDS*, including the *CDM/BDM* (see Figure 1).

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

#### 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.

NOTE This does not mean that compliance is required with all clauses of the referenced documents, but rather that this international standard makes a reference that cannot be understood in the absence of the referenced document.

IEC 60034 (all parts), *Rotating electrical machines*

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

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

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

IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*<sup>1)</sup>  
Amendment 1 (2000)  
Amendment 2 (2002)

IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60664-4:2005, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

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

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

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

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

IEC 60755, *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 61230, *Live working – Portable equipment for earthing or earthing and short-circuiting*

IEC 61800-1, *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, *Adjustable speed electrical power drive systems – Part 2: General requirements – Rating specifications for low voltage adjustable frequency a.c. power drive systems*

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

IEC 62020, *Electrical accessories – Residual current monitors for household and similar uses (RCMs)*

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<sup>1</sup> There exists a consolidated edition 1.2 (2002) including IEC 60664-1:1992 and its Amendments 1 and 2.

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

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

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

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

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

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

IEC 60050-601, *International Electrotechnical Vocabulary (IEV) – 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 60068-2-2:1974, *Environmental testing – Part 2: Tests. Tests B: Dry heat*

IEC 60068-2-6, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-78, *Environmental testing – Part 78: Tests – Test Cab: Damp heat, steady state*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60204-11, *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*

IEC 60309, *Plugs, socket-outlets and couplers for industrial purposes*

IEC 60364-1, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions*

IEC 60364-5-54:2002, *Electrical installations of buildings – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements, protective conductors and protective bonding conductors*

IEC 60417, *Graphical symbols for use on equipment*

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

IEC 60617, *Graphical symbols for diagrams*

IEC 62271-102, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*

ISO 3864 (all parts), *Graphical symbols – Safety colours and safety signs*

ISO 7000:2004, *Graphical symbols for use on equipment – Index and synopsis*

### 3 Terms and definitions

For the purposes of this international standard, the terms and definitions given in IEC 60050-111, IEC 60050-151, IEC 60050-161, IEC 60050-191, IEC 60050-441, IEC 60050-442, IEC 60050-551, IEC 60050-601, IEC 60664-1, IEC 61800-1, IEC 61800-2, IEC 61800-3 and IEC 61800-4 (some of which are repeated below for convenience), and the following definitions apply.

Table 1 provides an alphabetical cross-reference listing of terms.

**Table 1 – Alphabetical list of terms**

| Term                             | Term number | Term                              | Term number | Term                          | Term number |
|----------------------------------|-------------|-----------------------------------|-------------|-------------------------------|-------------|
| adjacent circuit                 | 3.1         | (earth) leakage current           | 3.16        | protective screening          | 3.31        |
| basic drive module (BDM)         | 3.2         | live part                         | 3.17        | protective separation         | 3.32        |
| basic insulation                 | 3.3         | low-voltage PDS                   | 3.18        | reinforced insulation         | 3.33        |
| CDM (complete drive module )     | 3.4         | open-type (product)               | 3.19        | routine test                  | 3.34        |
| closed electrical operating area | 3.5         | power drive system (PDS)          | 3.20        | safety ELV (SELV) circuit     | 3.35        |
| commissioning test               | 3.6         | protective ELV (PELV) circuit     | 3.21        | sample test                   | 3.36        |
| decisive voltage class (DVC)     | 3.7         | prospective short-circuit current | 3.22        | supplementary insulation      | 3.37        |
| double insulation                | 3.8         | protective bonding                | 3.23        | system voltage                | 3.38        |
| extra low voltage (ELV)          | 3.9         | protective class 0                | 3.24        | temporary overvoltage         | 3.39        |
| electrical breakdown             | 3.10        | protective class I                | 3.25        | touch current                 | 3.40        |
| expected lifetime                | 3.11        | protective class II               | 3.26        | type test                     | 3.41        |
| functional insulation            | 3.12        | protective class III              | 3.27        | user terminal                 | 3.42        |
| high-voltage PDS                 | 3.13        | protective earthing (PE)          | 3.28        | working voltage               | 3.43        |
| installation                     | 3.14        | protective earthing conductor     | 3.29        | zone of equipotential bonding | 3.44        |
| integrated PDS                   | 3.15        | protective impedance              | 3.30        |                               |             |

#### 3.1

##### **adjacent circuit**

circuit having no galvanic connection to the circuit under consideration

NOTE A protective impedance is not considered to be a galvanic connection.