

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**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 – Électrique, thermique et énergétique**

<https://standards.iteh.ai/iec/61800-5-1:2007>

<https://standards.iteh.ai/standards/iec/doc/35abc-02e4-4999-87da-2119287f6497/iec-61800-5-1-2007>



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2016 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Catalogue IEC - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

#### Recherche de publications IEC - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [csc@iec.ch](mailto:csc@iec.ch).

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**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 – Électrique, thermique et énergétique**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 29.130

ISBN 978-2-8322-3624-6

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

Withdrawn

iTech Standards  
(<https://standards.iteh.ai>)  
Document Preview

[IEC 61800-5-1:2007](https://standards.iteh.ai/standards/iec/61800-5-1:2007)

<https://standards.iteh.ai/standards/iec/61800-5-1:2007>

## REDLINE VERSION

## VERSION REDLINE



**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 – Électrique, thermique et énergétique**

<https://standards.iteh.ai/standards/iec/61800-5-1:2007>

<https://standards.iteh.ai/standards/iec/61800-5-1:2007>

## CONTENTS

FOREWORD .....	5
1 Scope .....	7
2 Normative references .....	7
3 Terms and definitions .....	10
4 Protection against electric shock, thermal, and energy hazards .....	17
4.1 General .....	17
4.2 Fault conditions .....	18
4.3 Protection against electric shock .....	19
4.4 Protection against thermal hazards .....	53
4.5 Protection against energy hazards .....	58
4.6 Protection against environmental stresses .....	59
5 Test requirements .....	59
5.1 General .....	59
5.2 Test specifications .....	62
6 Information and marking requirements .....	88
6.1 General .....	88
6.2 Information for selection .....	90
6.3 Information for installation and commissioning .....	90
6.4 Information for use .....	94
6.5 Information for maintenance .....	96
Annex A (informative) Examples of protection in case of direct contact .....	98
Annex B (informative) Examples of overvoltage category reduction .....	100
Annex C (normative) Measurement of clearance and creepage distances .....	106
Annex D (informative) Altitude correction for clearances .....	112
Annex E (informative) Clearance and creepage distance determination for frequencies greater than 30 kHz .....	114
Annex F (informative) Cross-sections of round conductors .....	117
Annex G (informative) Guidelines for RCD compatibility .....	118
Annex H (informative) Symbols referred to in this part of IEC 61800 .....	121
Bibliography .....	122
Figure 1 – PDS hardware configuration within an <i>installation</i> .....	17
Figure 2 – Typical waveform for a.c. <i>working voltage</i> .....	20
Figure 3 – Typical waveform for d.c. <i>working voltage</i> .....	21
Figure 4 – Typical waveform for pulsating <i>working voltage</i> .....	21
Figure 5 – Examples for protection against direct contact .....	23
Figure 6 – Example of <i>protective bonding</i> .....	27
Figure 7 – Voltage limits under fault conditions .....	29
Figure 8 – Voltage test procedures .....	70
Figure 9 – Circuit for high-current arcing test .....	80
Figure 10 – Test fixture for hot-wire ignition test .....	81
Figure 11 – Example of short-circuit test between CDM/BDM motor power output and protective earth (motor separately earthed) .....	75

Figure 12 – Example of short-circuit test between CDM/BDM motor power output and protective earth (motor earthed through CDM/BDM) .....	75
Figure 13 – Example of short-circuit test between CDM/BDM d.c. link power output and protective earth .....	76
Figure A.1 – Protection by DVC A, with protective separation .....	98
Figure A.2 – Protection by means of protective impedance .....	99
Figure A.3 – Protection by using limited voltages .....	99
Figure B.1 – Basic insulation evaluation for circuits connected directly to the origin of the installation supply mains .....	100
Figure B.2 – Basic insulation evaluation for circuits connected directly to the supply mains .....	101
Figure B.3 – Basic insulation evaluation for equipment not permanently connected to the supply mains .....	101
Figure B.4 – Basic insulation evaluation for circuits connected directly to the origin of the installation supply mains where internal SPDs are used .....	101
Figure B.5 – Basic insulation evaluation for circuits connected directly to the supply mains where internal SPDs are used .....	102
Figure B.6 – Example of protective separation evaluation for circuits connected directly to the supply mains where internal SPDs are used .....	102
Figure B.7 – Example of protective separation evaluation for circuits connected directly to the supply mains where internal SPDs are used .....	102
Figure B.8 Example of protective separation evaluation for circuits connected directly to the supply mains where internal SPDs are used .....	103
Figure B.9 – Basic insulation evaluation for circuits not connected directly to the supply mains .....	103
Figure B.10 – Basic insulation evaluation for circuits not connected directly to the supply mains .....	103
Figure B.11 – Functional insulation evaluation within circuits affected by external transients .....	104
Figure B.12 – Basic insulation evaluation for circuits both connected and not connected directly to the supply mains .....	104
Figure B.13 – Insulation evaluation for accessible circuit of DVC A .....	105
Figure E.1 – Determination of clearance for frequencies greater than 30 kHz .....	114
Figure E.2 – Determination of creepage for frequencies greater than 30 kHz .....	115
Figure G.1 – Flow chart leading to selection of the RCD/RCM type upstream of a PDS .....	118
Figure G.2 – Fault current waveforms in connections with semiconductor devices .....	119
Table 1 – Alphabetical list of terms .....	10
Table 2 – Relevance of requirements to PDS/CDM/BDM .....	18
Table 3 – Summary of the limits of the decisive voltage classes .....	19
Table 4 – Protection requirements for considered circuit .....	20
Table 5 – Protective earthing conductor cross-section .....	29
Table 6 – Definitions of pollution degrees .....	32
Table 7 – Insulation voltage for low voltage circuits .....	34
Table 8 – Insulation voltage for high voltage circuits .....	34
Table 9 – Clearance distances .....	38
Table 10 – Creepage distances (mm) .....	40

Table 11 – Thickness of sheet metal for enclosures: carbon steel or stainless steel.....	46
Table 12 – Thickness of sheet metal for enclosures: aluminium, copper or brass.....	47
Table 13 – Wire bending space from terminals to enclosure .....	50
Table 14 – Generic materials for the direct support of uninsulated <i>live parts</i> .....	54
Table 15 – Maximum measured temperatures for internal materials and components.....	55
Table 16 – Maximum measured temperatures for external parts of the <i>CDM</i> .....	56
Table 17 – Test overview.....	61
Table 18 – Impulse voltage test .....	65
Table 19 – Impulse test voltage for <i>low-voltage PDS</i> .....	66
Table 20 – Impulse test voltage for <i>high-voltage PDS</i> .....	66
Table 21 – A.C. or d.c. test voltage for circuits connected directly to low voltage mains .....	67
Table 22 – A.C. or d.c. test voltage for circuits connected directly to high voltage mains .....	68
Table 23 – A.C. or d.c. test voltage for circuits not connected directly to the mains.....	69
Table 24 – Partial discharge test.....	72
Table 25 – Dry heat test (steady state) .....	83
Table 26 – Damp heat test (steady state).....	84
Table 27 – Vibration test.....	84
Table 28 – Information requirements.....	89
<b>Table 29 – Maximum tripping time for <i>electronic motor overload protection test</i> .....</b>	<b>86</b>
Table C.1 – Width of grooves by pollution degree.....	106
Table D.1 – Correction factor for clearances at altitudes between 2 000 m and 20 000 m (see 4.3.6.4.1).....	112
Table D.2 – Test voltages for verifying clearances at different altitudes .....	113
Table E.1 – Minimum values of clearances in air at atmospheric pressure for inhomogeneous field conditions (Table 1 of IEC 60664-4) .....	115
Table E.2 – Minimum values of creepage distances for different frequency ranges (Table 2 of IEC 60664-4) .....	116
Table F.1 – Standard cross-sections of round conductors.....	117
Table H.1 – Symbols used.....	121



INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –**

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

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.
- 2) The formal decisions or agreements of 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 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.

**This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.**

**IEC 61800-5-1 edition 2.1 contains the second edition (2007-07) [documents 22G/178/FDIS and 22G/181/RVD] and its amendment 1 (2016-08) [documents 22G/338/FDIS and 22G/342/RVD].**

**In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.**

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 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.

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 the base publication and its amendment 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.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## 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 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 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*  
IEC 60364-4-41:2005/AMD1:—<sup>1</sup>

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)*

---

<sup>1</sup> Under preparation. Stage at the time of publication: IEC DEC 60364-4-41:2016.

IEC 60617, *Graphical symbols for diagrams*

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

IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coatings to achieve insulation coordination of printed board assemblies*

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 60947-4-1:2009, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*  
IEC 60947-4-1:2009/AMD1:2012

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*

---

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

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

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.