

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Adjustable speed electrical power drive systems –
Part 3: EMC requirements and specific test methods**

**Entraînements électriques de puissance à vitesse variable –
Partie 3: Exigences de CEM et méthodes d'essais spécifiques**

IEC 61800-3:2004

<https://standards.iteh.ai/standards/iec/e20173d8-820e-45dc-bcd3-3e8e7f139b17/iec-61800-3-2004>



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2012 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 la CEI ou du Comité national de la CEI du pays du demandeur.
Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI 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
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.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you 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It also gives information on projects, replaced and withdrawn publications.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

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

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - 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.

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) 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 CEI

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

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI 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.

Just Published CEI - webstore.iec.ch/justpublished

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

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - 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.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Adjustable speed electrical power drive systems –
Part 3: EMC requirements and specific test methods**

**Entraînements électriques de puissance à vitesse variable –
Partie 3: Exigences de CEM et méthodes d'essais spécifiques**

IEC 61800-3:2004

<https://standards.iteh.ai/standards/iec/e20173d8-820e-45dc-bcd3-3e8e7f139b17/iec-61800-3-2004>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.200; 33.100

ISBN 978-2-88912-880-8

**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.**

CONTENTS

FOREWORD.....	5
1 Scope and object.....	7
2 Normative references	8
3 Terms and definitions	10
4 Common requirements.....	17
4.1 General conditions.....	17
4.2 Tests.....	17
4.3 Documentation for the user.....	18
5 Immunity requirements	19
5.1 General conditions.....	19
5.2 Basic immunity requirements – Low-frequency disturbances.....	21
5.3 Basic immunity requirements – High-frequency disturbances.....	30
5.4 Application of immunity requirements – statistical aspect.....	35
6 Emission	35
6.1 General emission requirements.....	35
6.2 Basic low-frequency emission limits.....	36
6.3 Conditions related to high-frequency emission measurement.....	39
6.4 Basic high-frequency emission limits.....	40
6.5 Engineering practice.....	43
6.6 Application of emission requirements – statistical aspects.....	47
Annex A (informative) EMC techniques.....	48
A.1 General overview of EMC phenomena.....	48
A.2 Load conditions regarding high-frequency phenomena.....	51
A.3 Some immunity aspects	52
A.4 High-frequency emission measurement techniques.....	53
Annex B (informative) Low-frequency phenomena	58
B.1 Commutation notches	58
B.2 Definitions related to harmonics and interharmonics	63
B.3 Application of harmonic emission standards	69
B.4 Installation rules/Assessment of harmonic compatibility	78
B.5 Voltage unbalance	84
B.6 Voltage dips – Voltage fluctuations.....	87
B.7 Verification of immunity to low frequency disturbances.....	90
Annex C (informative) Reactive power compensation – filtering.....	91
C.1 Installation.....	91
C.2 Reactive power and harmonics.....	99
Annex D (informative) Considerations on high-frequency emission.....	103
D.1 User guidelines.....	103
D.2 Safety and RFI-filtering in power supply systems.....	107

Annex E (informative) EMC analysis and EMC plan	109
E.1 General – System EMC analysis applied to PDSs	109
E.2 Example of EMC plan for general applications	112
E.3 Example of supplement to EMC plan for particular application	116
Bibliography	120
Figure 1 – Definition of the installation and its content	11
Figure 2 – Internal interfaces of the PDS and examples of ports	14
Figure 3 – Power interfaces of a PDS with common d.c. BUS	15
Figure 4 – Power interfaces with common input transformer	15
Figure 5 – Propagation of disturbances	38
Figure 6 – Propagation of disturbances in installation with a PDS rated > 1 000 V	45
Figure A.1 – Coordination between disturbance and immunity	50
Figure B.1 – Typical waveform of commutation notches – Distinction from non-repetitive transient	58
Figure B.2 – PCC, IPC, Installation current ratio and R_{SI}	68
Figure B.3 – PCC, IPC, Installation current ratio and R_{SC}	69
Figure B.4 – Assessment of the harmonic emission of a PDS	72
Figure B.5 – Load conditions for the measurement of harmonic emission of a PDS	73
Figure B.6 – Test set up with mechanical load	74
Figure B.7 – Test set up with electrical load replacing the loaded motor	74
Figure B.8 – Test set up with resistive load	75
Figure B.9 – Assessment of harmonic emission where PDS are is used (apparatus, systems or installations)	80
Figure C.1 – Reactive power compensation	94
Figure C.2 – Simplified diagram of an industrial network	96
Figure C.3 – Impedance versus frequency of the simplified network	96
Figure C.4 – Example of passive filter battery	99
Figure C.5 – Example of inadequate solution in reactive power compensation	100
Figure D.1 – Conducted emission of various unfiltered PDSs	104
Figure D.2 – Expected radiated emission of PDS up to rated voltage 400 V Peak values normalised at 10 m	105
Figure D.3 – Safety and filtering	108
Figure E.1 – Interaction between systems and EM environment	109
Figure E.2 – Zone concept	110
Figure E.3 – Example of drive	111
Table 1 – Criteria to prove the acceptance of a PDS against electromagnetic disturbances	20
Table 2 – Minimum immunity requirements for harmonics and commutation notches/voltage distortion on power ports of low voltage PDSs	22
Table 3 – Minimum immunity requirements for harmonics and commutation notches/voltage distortion on main power ports of PDSs of rated voltage above 1 000 V	24
Table 4 – Minimum immunity requirements for harmonics and commutation notches/voltage distortion on auxiliary low voltage power ports of PDSs	25

Table 5 – Minimum immunity requirements for voltage deviations, dips and short interruptions on power ports of low voltage PDSs	25
Table 6 – Minimum immunity requirements for voltage deviations, dips and short interruptions on main power ports of rated voltage above 1 000 V of PDSs	27
Table 7 – Minimum immunity requirements for voltage deviations, dips and short interruptions on auxiliary low voltage power ports of PDSs.....	28
Table 8 – Minimum immunity requirements for voltage unbalance and frequency variations on power ports of low voltage PDSs	29
Table 9 – Minimum immunity requirements for voltage unbalance and frequency variations on main power ports of rated voltage above 1 000 V of PDSs.....	29
Table 10 – Minimum immunity requirements for voltage unbalance and frequency variations on auxiliary low voltage power ports of PDSs.....	30
Table 11–Minimum immunity requirements for PDSs intended for use in the first environment.....	31
Table 12 – Minimum immunity requirements for PDSs intended for use in the second environment.....	33
Table 13 – Summary of emission requirements.....	36
Table 14 – Limits for mains terminal disturbance voltage in the frequency band 150 kHz to 30 MHz	40
Table 15 – Limits for electromagnetic radiation disturbance in the frequency band 30 MHz to 1 000 MHz	41
Table 16 – Limits of disturbance voltage on the power interface – Option 2.....	42
Table 17 – Limits for mains terminal disturbance voltage in the frequency band 150 kHz to 30 MHz PDS in the second environment – PDS of category C3.....	42
Table 18 – Limits for electromagnetic radiation disturbance in the frequency band 30 MHz to 1 000 MHz PDS in the second environment – PDS of category C3.....	43
Table 19 – Limits for propagated disturbance voltage ("outside" in the first environment)	46
Table 20 –Limits for propagated disturbance voltage ("outside" in the second environment)	46
Table 21 – Limits for propagated electromagnetic disturbance above 30 MHz	46
Table 22 – Limits for electromagnetic disturbance below 30 MHz.....	47
Table 23 – Minimum immunity requirements for total harmonic distortion on power ports of low voltage PDSs.....	22
Table 24 – Minimum immunity requirements for individual harmonic orders on power ports of low voltage PDSs	23
Table 25 – Minimum immunity requirements for commutation notches on power ports of low voltage PDSs.....	23
Table A.1 – EMC overview	49
Table B.1 – Maximum allowable depth of commutation notches at the PC	62
Table B.2 – Harmonic current emission requirements relative to the total current of the agreed power at the PCC or IPC.....	82
Table B.3 – Verification plan for immunity to low frequency disturbances	90
Table E.1 – EM interaction between subsystems and environment.....	111
Table E.2 – Frequency analysis	118

<https://standards.globalspec.com/stds/iec/61800-3-2004>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ADJUSTABLE SPEED ELECTRICAL POWER
DRIVE SYSTEMS –****Part 3: EMC requirements and specific test methods**

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 IEC 61800-3 consists of the second edition (2004) [documents 22G/127/FDIS and 22G/131/RVD] and its amendment 1 (2011) [documents 22G/227/FDIS and 22G/229/RVD]. It bears the edition number 2.1.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

International Standard IEC 61800-3 has been prepared by sub-committee 22G: Adjustable speed electric drive systems incorporating semiconductor power converters, of IEC technical committee 22: Power electronic systems and equipment.

This second edition introduces three main changes:

- a) the classes of distribution (unrestricted and restricted) of the PDS have been replaced by categories of PDS (C1 to C4) with definitions related to the product itself and its intended use;
- b) better coverage of emission limits;
- c) an EMC plan is generalized for category C4.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 61800 consists of the following parts, under the general title *Adjustable speed electrical power drive systems*

- Part 1: General requirements – Rating specifications for low voltage adjustable speed d.c. power drive systems
- Part 2: General requirements – Rating specifications for low voltage adjustable frequency a.c. power drive systems
- Part 3: EMC requirements and specific test methods
- Part 4: General requirements – Rating specifications for a.c. power drive systems above 1 000 V a.c. and not exceeding 35 kV
- Part 5-1: Safety requirements – Electrical, thermal and energy
- Part 6: Guide for determination of types of load duty and corresponding current ratings

The committee has decided that the contents of the base publication and its amendments 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 publication using a colour printer.

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 3: EMC requirements and specific test methods

1 Scope and object

This part of IEC 61800 specifies electromagnetic compatibility (EMC) requirements for power drive systems (PDSs). A PDS is defined in 3.1. These are adjustable speed a.c. or d.c. motor drives. Requirements are stated for PDSs with converter input and/or output voltages (line-to-line voltage), up to 35 kV a.c. r.m.s.

PDSs covered by this standard are those installed in residential, commercial and industrial locations with the exception of traction applications, and electric vehicles. PDSs may be connected to either industrial or public power distribution networks. Industrial networks are supplied by a dedicated distribution transformer, which is usually adjacent to or inside the industrial location, and supplies only industrial customers. Industrial networks can also be supplied by their own electric generating equipment. On the other hand, PDSs can be directly connected to low-voltage public mains networks which also supply domestic premises, and in which the neutral is generally earthed (grounded).

The scope of this part of IEC 61800, related to EMC, includes a broad range of PDSs from a few hundred watts to hundreds of megawatts. PDSs are often included in a larger system. The system aspect is not covered by this standard but guidance is provided in the informative annexes.

The requirements have been selected so as to ensure EMC for PDSs at residential, commercial and industrial locations. The requirements cannot, however, cover extreme cases which may occur with an extremely low probability. Changes in the EMC behaviour of a PDS, as a result of fault conditions, are not taken into account.

The object of this standard is to define the limits and test methods for a PDS according to its intended use. This standard includes immunity requirements and requirements for electromagnetic emissions.

NOTE 1 Emission can cause interference in other electronic equipment (for example radio receivers, measuring and computing devices). Immunity is required to protect the equipment from continuous and transient conducted and radiated disturbances including electrostatic discharges. The emission and immunity requirements are balanced against each other and against the actual environment of the PDS.

This standard defines the minimum EMC requirements for a PDS.

Immunity requirements are given according to the environment classification. Low-frequency emission requirements are given according to the nature of the supply network. High-frequency emission requirements are given according to four categories of intended use, which cover both environment and bringing into operation.

As a product standard, this standard may be used for the assessment of PDS. It may also be used for the assessment of CDM or BDM (see 3.1), which can be marketed separately.

This standard contains:

- conformity assessment requirements for products to be placed on the market;
- recommended engineering practice (see 6.5) for cases where high frequency emissions cannot be measured before the equipment is placed on the market (such PDSs are defined in 3.2.6 as category C4).

NOTE 2 The first edition of IEC 61800-3 identified that the intended use could require engineering for putting into service. This was done by the “restricted distribution mode”. Equipment that used to be covered by the “restricted distribution mode” is covered in the second edition by categories C2 and C4 (see 3.2).

This standard is intended as a complete EMC product standard for the EMC conformity assessment of products of categories C1, C2 and C3, when placing them on the market (see definitions 3.2.3 to 3.2.5).

Radio frequency emission of equipment of category C4 is only assessed when it is installed in its intended location. It is therefore treated as a fixed installation, for which this standard gives rules of engineering practice in 6.5 and annex E, although it gives no defined emission limits (except in case of complaint).

This standard does not specify any safety requirements for the equipment such as protection against electric shocks, insulation co-ordination and related dielectric tests, unsafe operation, or unsafe consequences of a failure. It also does not cover safety and functional safety implications of electromagnetic phenomena.

In special cases, when highly susceptible apparatus is being used in proximity, additional mitigation measures may have to be employed to reduce the electromagnetic emission further below the specified levels or additional countermeasures may have to be employed to increase the immunity of the highly susceptible apparatus.

As an EMC product standard for PDSs, this standard takes precedence over all aspects of the generic standards and no additional EMC tests are required or necessary. If a PDS is included as part of equipment covered by a separate EMC product standard, the EMC standard of the complete equipment applies.

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 60050 (131):2002, *International Electrotechnical Vocabulary (IEV) – Chapter 131: Circuit theory*

IEC 60050 (151):2001, *International Electrotechnical Vocabulary (IEV) – Chapter 151: Electrical and magnetic devices*

IEC 60050 (161):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

IEC 60146-1-1:1991, *Semiconductor convertors – General requirements and line commutated convertors – Part 1-1: Specifications of basic requirements*

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

IEC 60664-1:1992, *Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61000-1-1, *Electromagnetic compatibility (EMC) – Part 1: General – Section 1: Application and interpretation of fundamental definitions and terms*

IEC 61000-2-1:1990, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 1: Description of the environment – Electromagnetic environment for low-frequency conducted disturbances and signalling in public power supply systems*

IEC 61000-2-2:2002, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 2: Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-2-4:2003³², *Electromagnetic compatibility (EMC) – Part 2-4: Environment – Compatibility levels in industrial plants for low-frequency conducted disturbances*

IEC 61000-2-6:1995, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 6: Assessment of the emission levels in the power supply of industrial plants as regards low-frequency conducted disturbances*

IEC 61000-3-2:2000, *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 2: Limits for harmonic current emissions (equipment with input current ≤ 16 A per phase)*

IEC 61000-3-3:1994, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤ 16 A per phase and subject to conditional connection*

IEC 61000-3-4:1998, *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 4: Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A*

IEC 61000-3-7:1996, *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 7: Limits for fluctuating loads in MV and HV power systems – Basic EMC publication*

IEC 61000-3-11:2000, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test Basic EMC publication*

IEC 61000-4-3:2002, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test Basic EMC publication*

IEC 61000-4-4:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test Basic EMC publication*
Amendment 1 (2000)
Amendment 2 (2001)

IEC 61000-4-5:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 5: Surge immunity test*

IEC 61000-4-6:2003, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2001, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test Basic EMC publication*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*

IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase*

IEC 61800-1:1997, *Adjustable speed electrical power drive systems – Part 1: Rating specifications for low voltage 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 61800-4:2002, *Adjustable speed electrical power drive systems – Part 4: General requirements – Rating specifications for a.c. power drive systems above 1000 V and not exceeding 35 kV*

CISPR 11:2003, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*

CISPR 14, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus*

CISPR 16-1:2002, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1: Radio disturbance and immunity measuring apparatus*

CISPR 22:2003, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

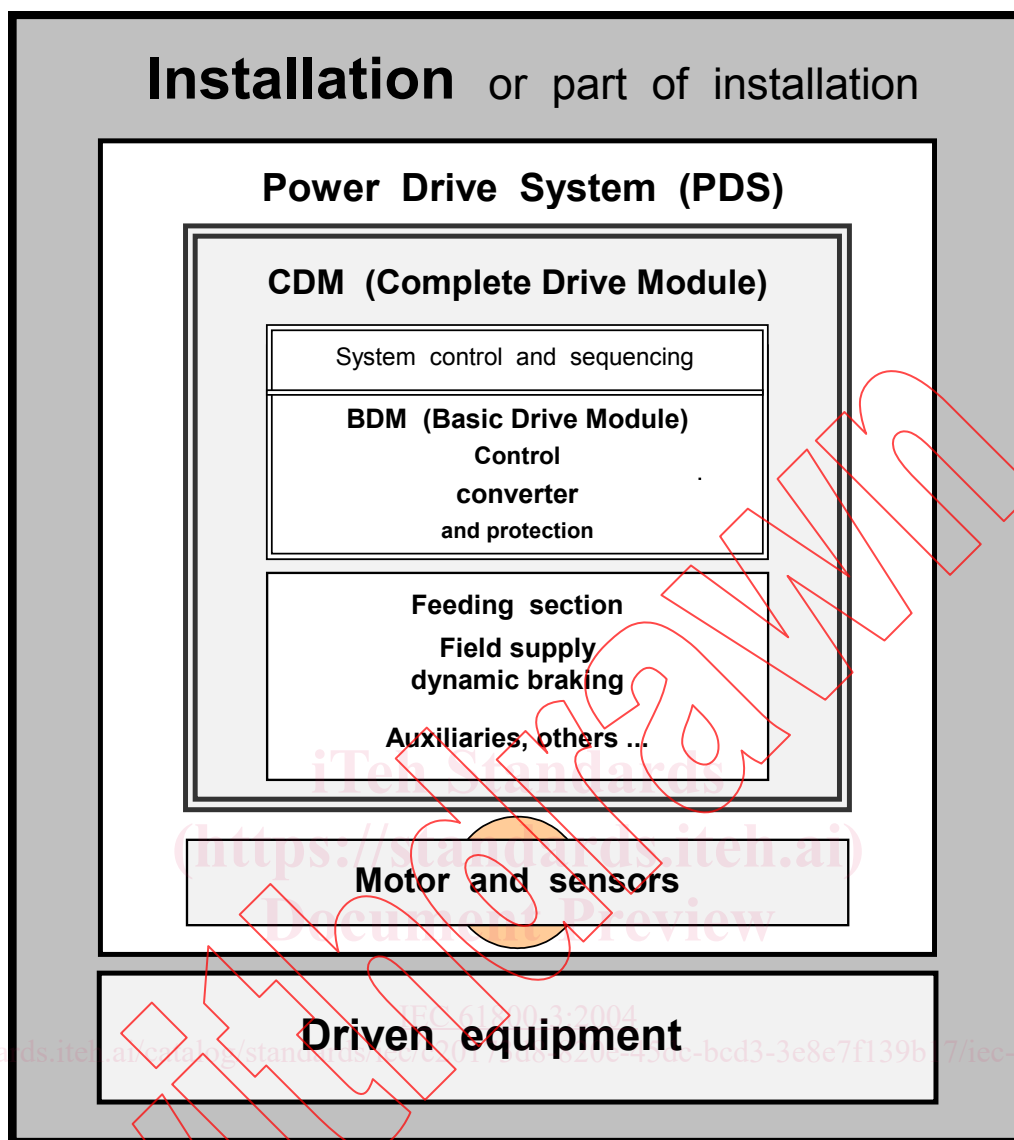
3 Terms and definitions

3.1 Overview Definition of the installation and its content

For the purposes of this document, definitions related to EMC and to relevant phenomena to be found in IEC 60050(161), in CISPR, and also, the following additional definitions apply.

A power drive system (PDS) consists of a motor and a complete drive module (CDM). It does not include the equipment driven by the motor. The CDM consists of a basic drive module (BDM) and its possible extensions such as the feeding section or some auxiliaries (e.g. ventilation). The BDM contains converter, control and self-protection functions. Figure 1 shows the boundary between the PDS and the rest of the installation and/or manufacturing process. IEC 61800-1, IEC 61800-2 and IEC 61800-4 give details for these definitions.

Figure 1 shows the major parts of the PDS as defined below and the rest of the installation.



IEC 923/04

Figure 1 – Definition of the installation and its content

~~If the PDS has its own dedicated transformer, this transformer is included as a part of the GDM.~~

3.1.1 basic drive module BDM

electronic power converter and related control, connected between an electric supply and a motor. The BDM is capable of transmitting power from the electric supply to the motor and may be capable of transmitting power from the motor to the electric supply. The BDM controls some or all of the following aspects of power transmitted to the motor and motor output:

- current;
- frequency;
- voltage;
- speed;
- torque;
- force;

- position

3.1.2

complete drive module

CDM

drive module consisting of, but not limited to, the BDM and extensions such as protection devices, transformers and auxiliaries. However the motor and the sensors which are mechanically coupled to the motor shaft are not included

3.1.3

power drive system

PDS

system consisting of one or more complete drive module(s) (CDM) and a motor or motors. Any sensors which are mechanically coupled to the motor shaft are also part of the PDS; however the driven equipment is not included

3.1.4

installation

equipment or equipments which include at least both the PDS and the driven equipment

3.2 Intended use

3.2.1

first environment

environment that includes domestic premises, it also includes establishments directly connected without intermediate transformers to a low-voltage power supply network which supplies buildings used for domestic purposes

NOTE Houses, apartments, commercial premises or offices in a residential building are examples of first environment locations.

3.2.2

second environment

environment that includes all establishments other than those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes

NOTE Industrial areas, technical areas of any building fed from a dedicated transformer are examples of second environment locations.

3.2.3

PDS of category C1

PDS of rated voltage less than 1 000 V, intended for use in the first environment

3.2.4

PDS of category C2

PDS of rated voltage less than 1 000 V, which is neither a plug in device nor a movable device and, when used in the first environment, is intended to be installed and commissioned only by a professional

NOTE A professional is a person or an organisation having necessary skills in installing and/or commissioning power drive systems, including their EMC aspects.

3.2.5

PDS of category C3

PDS of rated voltage less than 1 000 V, intended for use in the second environment and not intended for use in the first environment

3.2.6

PDS of category C4

PDS of rated voltage equal to or above 1 000 V, or rated current equal to or above 400 A, or intended for use in complex systems in the second environment