BS EN IEC 61800-2:2021

BSI Standards Publication

Adjustable speed electrical power drive systems

Part 2: General requirements — Rating specifications
for adjustable speed AC power drive systems

bsi.

National foreword

This British Standard is the UK implementation of EN IEC 61800-2:2021. It is identical to IEC 61800-2:2021. It supersedes BS EN 61800-2:2015, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/22, Power electronics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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EUROPEAN STANDARD

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English Version

Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for adjustable speed AC power drive systems (IEC 61800-2:2021)

Entraînements électriques de puissance à vitesse variable - Partie 2: Exigences générales - Spécifications de dimensionnement pour entraînements électriques de puissance à vitesse variable en courant alternatif (IEC 61800-2:2021)

Drehzahlveränderbare elektrische Antriebe - Teil 2: Allgemeine Anforderungen - Festlegungen für die Bemessung von Niederspannungs-Wechselstrom-Antriebssystemen mit einstellbarer Frequenz (IEC 61800-2:2021)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 22G/432/FDIS, future edition 3 of IEC 61800-2, prepared by SC 22G "Adjustable speed electric power drive systems (PDS)" of IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61800-2:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-01-07
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-04-07

This document supersedes EN 61800-2:2015 and all of its amendments and corrigenda (if any).

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The text of the International Standard IEC 61800-2:2021 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 60027-3	NOTE	Harmonized as EN 60027-3
IEC 60034-1	NOTE	Harmonized as EN 60034-1
IEC 60034-14	NOTE	Harmonized as EN IEC 60034-14
IEC 60034-18-31	NOTE	Harmonized as EN 60034-18-31
IEC/TS 60034-25	NOTE	Harmonized as CLC/TS 60034-25
IEC 60034-30 (series)	NOTE	Harmonized as EN 60034-30 (series)
IEC 60068-2-6	NOTE	Harmonized as EN 60068-2-6
IEC 60068-2-52	NOTE	Harmonized as EN IEC 60068-2-52
IEC 60068-2-68	NOTE	Harmonized as EN 60068-2-68
IEC 60068-2-78	NOTE	Harmonized as EN 60068-2-78
IEC 60076-1	NOTE	Harmonized as EN 60076-1

IEC 60146 (series)	NOTE	Harmonized as EN 60146 (series)
IEC 60204-1	NOTE	Harmonized as EN 60204-1
IEC 60364 (series)	NOTE	Harmonized as HD 60364 (series)
IEC 60529	NOTE	Harmonized as EN 60529
IEC 60664-1	NOTE	Harmonized as EN IEC 60664-1
IEC 60721 (series)	NOTE	Harmonized as EN 60721 (series)
IEC 60721-2-6	NOTE	Harmonized as HD 478.2.6 S1
IEC 61131-2	NOTE	Harmonized as EN 61131-2
IEC 61158 (series)	NOTE	Harmonized as EN 61158 (series)
IEC 61378 (series)	NOTE	Harmonized as EN 61378 (series)
IEC 61378-1	NOTE	Harmonized as EN 61378-1
IEC 61439-1	NOTE	Harmonized as EN 61439-1
IEC 61800-1	NOTE	Harmonized as EN IEC 61800-1
IEC 61800-4:2002	NOTE	Harmonized as EN 61800-4:2003 (not modified)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 2: General requirements – Rating specifications for adjustable speed AC power drive systems

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.
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International Standard IEC 61800-2 has been prepared by subcommittee 22G: Adjustable speed electric power drive systems (PDS), of IEC technical committee 22: Power electronic systems and equipment.

This third edition cancels and replaces the second edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) the requirements from IEC 61800-4 for high-voltage PDS are now merged with requirements from IEC 61800-2:2015, and IEC 61800-4:2002 will be withdrawn upon release of this document;
b) Clause 1 has been updated to introduce the new concept of Clause 4;

c) terms and definitions in Table 1 to Table 4 have been classified in logical order; classification in low voltage and high voltage has been considered in Table 5, and Figure 3 clarifies boundaries within *BDM/CDM/PDS*.

d) Clause 4 is new and creates the methods for evaluating a product to this document;

e) Clause 5 has been updated with respect to:

   1) specific content for high-voltage *BDM/CDM/PDS*;

   2) description of the basic topology for *BDM/CDM/PDS* (5.2);

   3) ratings and performance (5.3 and 5.4);

   4) reference to applicable standards within the IEC 61800 series with respect to EMC (IEC 61800-3), electrical safety (IEC 61800-5-1), functional safety (IEC 61800-5-2), load duty aspects (IEC TR 61800-6), communication profiles (IEC 61800-7 series), *power interface* voltage (IEC TS 61800-8), and ecodesign (IEC 61800-9 series) to avoid conflicting requirements (5.5, 5.6, 5.7, 5.10, 5.11, 5.12);

   5) update of requirement for ecodesign (5.8);

   6) update of requirement for environmental evaluation (5.9);

   7) implementation of requirement for explosive atmosphere (5.14);

f) Clause 6 has been updated with test requirement in order to provide a clear link between design requirement and test requirement;

g) Clause 7 has been updated to harmonize the marking and documentation requirement within IEC 61800 (all parts);

h) existing Annex A and Annex B have been updated to include specific detail pertaining to *high voltage BDM/CDM/PDS*.

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

FDIS	Report on voting
22G/432/FDIS	22G/435/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 in the IEC 61800 series, published under the general title *Adjustable speed electrical power drive systems*, can be found on the IEC website.

In this document, the terms in *italics* are defined in Clause 3.

The committee has decided that the contents of this publication 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.

INTRODUCTION

0.1 General

This document is part of the IEC 61800 series specifying requirements for adjustable *speed* electrical *power drive systems* (*PDS*). Since the publication of the second edition of IEC 61800-2, several documents of the IEC 61800 series have been developed and maintained, which has resulted in outdated references and conflicting requirements across the IEC 61800 series.

This document contains general requirements for *PDS*s intended to feed AC *motors* and with rated *converter* input voltages (line-to-line voltage) up to 35 000 V AC.

PDSs intended to feed DC *motors* are covered by IEC 61800-1.

0.2 Consistency of requirement

This document specifies requirements for *PDS*s under its scope for the identified topics not covered by any other of the standards in the IEC 61800 series.

The following requirements are covered by other standards in the IEC 61800 series:

- DC *PDS* requirements are covered by IEC 61800-1;
- EMC requirements are covered by IEC 61800-3;
- general safety requirements are covered by IEC 61800-5-1;
- functional safety requirements are covered by IEC 61800-5-2;
- type of load duty guidance is covered by IEC TR 61800-6;
- interface and use of profiles requirements are covered by IEC 61800-7 (all parts);
- *power interface* voltage specification is covered by IEC TS 61800-8;
- ecodesign energy *efficiency* requirements of drive system are covered by IEC 61800-9 (all parts).

Generally, this document provides a basic description of topics and refers to the relevant standard for specific requirement. This is done in order to ensure consistency, to avoid conflicting requirement within IEC 61800 (all parts) and to optimize future maintenance of the documents.

As part of the work inside SC 22G MT9, this document defines basic definitions used across the IEC 61800 series. For issues related to *active infeed converters,* IEC TS 62578 has been considered.

As a result of the development of the IEC 61800 series of standards, the need to reference documents outside the series has decreased and especially the need to reference the IEC 60146 (all parts) has decreased dramatically.

0.3 Tool for agreement between *customer* and *manufacturer*

This document provides a non-exhaustive list of requirements to aid in the development of a functional specification between responsible parties. Each topic should be individually specified by the *responsible party*(ies) as a compliance requirement where appropriate for the intended application. When the *manufacturer* is the only *responsible party*, for any reason, the *manufacturer* may choose to select the specific sections of this document which are relevant for the intended application.

BDM/CDM/PDS may be built into a final installation or imbedded into an extended product as a component. The following are example applications: lift and hoist, machinery, conveyor, switchgears, heating and ventilation, pump, wind, tidal and marine propulsion applications.

In every application, an identification of the environmental conditions under which the product is stored, transported and operated is essential for the proper specification of the *BDM/CDM/PDS*. The environmental conditions considered should include at least those defined in IEC 60721 (all parts) and EMC.

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 2: General requirements – Rating specifications for adjustable speed AC power drive systems

1 Scope

This part of IEC 61800 applies to adjustable *speed* electric AC *power drive systems*, which include semiconductor power conversion and the means for their control, protection, monitoring, measurement and the AC *motor*s.

It applies to adjustable *speed* electric *power drive systems* intended to feed AC *motors* from a *BDM or CDM* connected to line-to-line voltages up to and including 35 kV AC 50 Hz or 60 Hz and/or voltages up to and including 1,5 kV DC input side.

NOTE Adjustable *speed* electric DC *power drive systems* intended to feed DC *motors* are covered by IEC 61800-1.

This documents defines and describes a non-exhaustive list of criteria for the selection of *BDM/CDM/PDS* performance and functional attributes. This list is reviewed by the responsible parties to determine considerations for the design of device(s), equipment or system(s) with related testing specification. It also suggests a selection of performance and functional attributes for driven equipment and extended products. The performance and functional attributes focus on the following categories:

- principal parts topology and classification of the *PDS*;
- ratings, performance and functionality;
- specifications for the environment in which the *PDS* is intended to be installed and operated;
- other specifications which might be applicable when specifying a complete *PDS*.

Traction applications and electric vehicles are excluded from the scope of this document.

This document provides a non-exhaustive list from which minimum requirements can be used for the development of a specification between *customer* and *manufacturer* based on the application requirements. This same non-exhaustive list can be used by a *manufacturer* to determine the minimum requirements for a commoditised *BDM/CDM/PDS* without *customer* interaction based on the specified application of that *BDM/CDM/PDS*.

For some aspects which are covered by specific *PDS* product standards in the IEC 61800 series, this document provides a short introduction and reference to detailed requirements in these product standards.

This applies to the following aspects:

- EMC requirements are covered by IEC 61800-3;
- general safety requirements are covered by IEC 61800-5-1;
- functional safety requirements are covered by IEC 61800-5-2;
- type of load duty guidance is covered by IEC TR 61800-6;
- interface and use of profiles requirements are covered by IEC 61800-7 (all parts);
- power interface voltage specification is covered by IEC TS 61800-8;