

INTERNATIONAL STANDARD

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

**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**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –**Part 2: General requirements –
Rating specifications for adjustable
speed AC power drive systems**

FOREWORD

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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IEC 61800-4 for high-voltage PDS are now merged with requirements from IEC 61800-2:2015, and IEC 61800-4:2002 will be withdrawn upon release of this document;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

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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 *PDSs* 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 *PDSs* 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 *motors*.

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 document 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;