SLOVENSKI STANDARD
SIST EN 61800-2:2001

01-junij-2001

Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency a.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

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

Entraînements électriques de puissance à vitesse variable -- Partie 2: Exigences générales - Spécifications de dimensionnement pour systèmes d'entraînement de puissance à fréquence variable en courant alternatif et basse tension

Ta slovenski standard je istoveten z: EN 61800-2:1998

ICS:

29.200	Usmerniki. Pretvorniki. Stabilizirano električno napajanje	Rectifiers. Convertors. Stabilized power supply

SIST EN 61800-2:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 61800-2

April 1998

ICS 29.200

English version

Adjustable speed electrical power drive systems
Part 2: General requirements
Rating specifications for low voltage adjustable frequency a.c. power drive systems
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Drehzahlveränderbare elektrische Antriebe
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(IEC 61800-2:1998)

This European Standard was approved by CENELEC on 1998-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 61800-2:1998 E

Foreword

The text of document 22G/40/FDIS, future edition 1 of IEC 61800-2, prepared by SC 22G, Semiconductor power converters for adjustable speed electric drive systems, of IEC TC 22, Power electronics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61800-2 on 1998-04-01.

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) 1999-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2001-01-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A, B, C, D, E, F and G are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61800-2:1998 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60034-1 (mod)	1996	Rotating electrical machines Part 1: Rating and performance	EN 60034-1	1998
IEC 60034-2	1972	Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)	EN 60034-2[1]	1996
IEC 60034-9 (mod) + corr. March	1990 1991	Part 9: Noise limits	EN 60034-9[2]	1993
IEC 60038 (mod)	1983	IEC standard voltages	HD 472 S1[3]	1989
IEC 60050(111)	1996	International Electrotechnical Vocabulary (IEV) Chapter 111: Physics and chemistry	-	-
IEC 60050(151)	1978	Chapter 151: Electrical and magnetic devices	-	-
IEC 60050(441)	1984	Chapter 441: Switchgear, controlgear and fuses	-	-
IEC 60050(551)	-[4]	Chapter 551: Power electronics	-	-
IEC 60050(601)	1985	Chapter 601: Generation, transmission and distribution of electricity - General	-	-
IEC 60076(mod)	series	Power transformers	EN 60076	series

1) EN 60034-2 includes the supplement IEC 60034-2A:1974.

2) EN 60034-9 is superseded by EN 60034-9:1997, which is based on IEC 60034-9:1997.

3) The title of HD 472 S1 is: *Nominal voltages for low voltage public electricity supply systems.*

4) Second edition, to be published.

Publication	Year	Title	EN/HD	Year
IEC 60146-1-1	1991	Semiconductor convertors General requirements and line commutated convertors Part 1-1: Specifications of basic requirements	EN 60146-1-1	1993
IEC 60146-1-2	1991	Part 1-2: Application guide	-	-
IEC 60146-1-3	1991	Part 1-3: Transformers and reactors	EN 60146-1-3	1993
IEC 60204-1 (mod)	1992	Safety of machinery Electrical equipment of machines Part 1: General requirements	EN 60204-1[5)]	1992
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60664-1 (mod)	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	HD 625.1 S1 + corr. November	1996 1996
IEC 60721-3-1	1997	Classification of environmental conditions Part 3: Classification of groups of environmental parameters and their severities Section 1: Storage	EN 60721-3-1	1997
IEC 60721-3-2	1997	Section 2: Transportation	EN 60721-3-2	1997
IEC 60721-3-3	1994	Section 3: Stationary use at weather protected locations	EN 60721-3-3	1995
IEC 60747	series	Semiconductor devices Discrete devices and integrated circuits	-	-
IEC 61000-2-4 + corr. August	1994 1994	Electromagnetic compatibility (EMC) Part 2: Environment Section 4: Compatibility levels in industrial plants for low-frequency conducted disturbances	EN 61000-2-4	1994
IEC 61000-4-7	1991	Part 4: Testing and measurement techniques Section 7: General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto	EN 61000-4-7	1993
IEC 61800-3	1996	Adjustable speed electrical power drive systems Part 3: EMC product standard including specific test method	EN 61800-3	1996

5) EN 60204-1 is superseded by EN 60204-1:1997, which is based on IEC 60204-1:1997.

Publication	Year	Title	EN/HD	Year
IEC Guide 106	1989	Guide for specifying environmental conditions for equipment performance rating	-	-

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Première édition
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Entraînements électriques de puissance à vitesse variable –

Partie 2: Exigences générales – Spécifications de dimensionnement pour systèmes d'entraînement de puissance à fréquence variable en courant alternatif et basse tension

Adjustable speed electrical power drive systems –

Part 2: General requirements – Rating specifications for low voltage adjustable frequency a.c. power drive systems

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 2: General requirements – Rating specifications for low voltage adjustable frequency a.c. power drive systems

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61800-2 has been prepared by IEC technical sub-committee 22G: Semiconductor power converters for adjustable speed electric drive systems, of IEC technical committee 22: Power electronics.

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

FDIS	Report on voting
22G/40/FDIS	22G/44/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.

Annexes A, B, C, D, E, F, and G are for information only.

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 2: General requirements – Rating specifications for low voltage adjustable frequency a.c. power drive systems

1 General

1.1 Scope and object

This part of IEC 61800 applies to general purpose adjustable speed a.c. drive systems which include power conversion, control equipment, and also an a.c. motor or motors. Excluded are traction and electrical vehicle drives.

It applies to systems connected to line voltages up to 1 kV a.c., 50 Hz or 60 Hz, and load side frequency up to 600 Hz.

EMC aspects are covered in IEC 61800-3.

This part of IEC 61800 gives the characteristics of the converters and their relationship with the complete a.c. drive system. It also states their performance requirements with respect to ratings, normal operating conditions, overload conditions, surge withstand capabilities, stability, protection, a.c. line earthing, and testing. Furthermore, it deals with application guidelines, such as control strategies, diagnostics, and topologies.

This part of IEC 61800 is intended to define a complete a.c. PDS in terms of its performance and not in terms of individual subsystem functional units.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61800. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 61800 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60034-1:1996, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-2:1972, *Rotating electrical machines – Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)*

IEC 60034-9:1990, *Rotating electrical machines – Part 9: Noise limits*

IEC 60038:1983, *IEC standard voltages*

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

IEC 60050(151):1978, *International Electrotechnical Vocabulary (IEV) – Chapter 151: Electrical and magnetic devices*

IEC 60050(441):1984, *International Electrotechnical Vocabulary (IEV) – Chapter 441: Switch-gear, control gear and fuses*

IEC 60050(551): *International Electrotechnical Vocabulary (IEV) – Chapter 551: Power electronics*[1)]

IEC 60050(601):1985, *International Electrotechnical Vocabulary (IEV) – Chapter 601: Generation, transmission and distribution of electricity – General*

IEC 60076: *Power transformers*

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

IEC 60146-1-2:1991, *Semiconductor convertors – General requirement and line commutated convertors – Part 1-2: Application guide*

IEC 60146-1-3:1991, *Semiconductor convertors – General requirement and line commutated convertors – Part 1-3: Transformers and reactors*

IEC 60204-1:1992, *Electrical equipment of industrial machines – Part 1: General requirements*

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

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

IEC 60721-3-1:1997, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 1: Storage*

IEC 60721-3-2:1997, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 2: Transportation*

IEC 60721-3-3:1994, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weatherprotected locations*

IEC 60747: *Semiconductor devices – Discrete devices and integrated circuits*

IEC 61000-2-4:1994, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 4: Compatibility levels in industrial plants for low-frequency conducted disturbances*

IEC 61000-4-7:1991, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 7: General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*

IEC 61800-3:1996, *Adjustable speed electrical power drive systems – Part 3: EMC product standard including specific test method*

IEC Guide 106:1989, *Guide for specifying environmental conditions for equipment performance rating*

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1) Second edition, to be published.

1.3 Symbols

Table 1 lists symbols defined and/or used in this part of IEC 61800.

Table 1 – Symbols

Parameter	Symbol	Unit	Definition
Rated system voltage	U_{LN}	V	2.4.1
Rated system frequency	f_{LN}	Hz	2.4.2
Line-side converter rated a.c. voltage	U_{VN}	V	2.4.3
Line-side rated a.c. current of the CDM/BDM	I_{LN}	A	2.4.4
Rated input current of the converter	I_{VN}	A	2.4.5
Line-side harmonic content	H_L	V or A	2.4.6
Line-side total harmonic distortion	THD_L	%	2.4.8
Converter input displacement factor	$\cos \varphi_{V1}$		2.4.9
Line side displacement factor	$\cos \varphi_{L1}$		2.4.10
Input total power factor	λ_L		2.4.11
Maximum allowable a.c. system, symmetrical short-circuit current	I_{SCM}	A	2.4.13
Short-circuit ratio	R_{SC}		2.4.13
Rated continuous output current	I_{aN}	A	2.5.1
Overload current (overload capability)	I_{aM}	A	2.5.2
Load side fundamental rated a.c. voltage	U_{aN1}	V	2.5.4
Base frequency	f_0	Hz	2.5.5
Rated fundamental output current	I_{aN1}	A	2.5.6
Efficiency of drive system	η_D	%	2.5.7
Efficiency of CDM	η_C	%	2.5.7
Load side harmonic distortion	THD_a	%	2.5.9
Slip	s	p.u.	2.7.5
Rated slip	s_N	p.u.	2.7.6
Base speed	N_0	r/min	2.7.7
Maximum operating speed	N_M	r/min	2.7.8
Minimum operating speed	N_{min}	r/min	2.7.9
Maximum safe motor speed	N_{smax}	r/min	2.7.10
Torque	M	Nm	
Inertia	J	kgm² or Nms²	