SVENSK STANDARD

SS-EN IEC 61800-3, utg 4:2024

Fastställd	Sida	Ansvarig kommitté
2024-04-24	1 (133)	SEK TK 22

Varvtalsstyrda elektriska drivsystem – Del 3: EMC-fordringar och speciella provningsmetoder

Adjustable speed electrical power drive systems – Part 3: EMC requirements and specific test methods for PDS and machine tools

Som svensk standard gäller europastandarden EN IEC 61800-3:2023. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 61800-3:2023.

Nationellt förord

Europastandarden EN IEC 61800-3:2023

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61800-3, Fourth edition, 2022 - Adjustable speed electrical power drive systems – Part 3: EMC requirements and specific test methods for PDS and machine tools**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN IEC 61800-3, utg 3:2018 med eventuella tillägg, ändringar och rättelser gäller ej fr o m 2026-08-09.

ICS 29.200.00; 33.100.01

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61800-3

October 2023

ICS 29.200; 33.100.01

Supersedes EN IEC 61800-3:2018

English Version

Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods for PDS and machine tools (IEC 61800-3:2022)

Entraînements électriques de puissance à vitesse variable - Partie 3: Exigences de CEM et méthodes d'essai spécifiques pour les PDS et machines-outils (IEC 61800-3:2022)

Drehzahlveränderbare elektrische Antriebssysteme - Teil 3: EMV-Anforderungen einschließlich spezieller Prüfverfahren für Antriebssysteme und Werkzeugmaschinen mit darin enthaltenen Antriebssystemen (IEC 61800-3:2022)

This European Standard was approved by CENELEC on 2023-08-09. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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

Ref. No. EN IEC 61800-3:2023 E

SEK Svensk Elstandard

SS-EN IEC 61800-3, utg 4:2024

European foreword

The text of document 22G/461/FDIS, future edition 4 of IEC 61800-3, 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 61800-3:2023.

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) 2024-05-09
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-08-09

This document supersedes EN IEC 61800-3:2018 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 61800-3:2022 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 standard indicated:

IEC 60038:2009	NOTE	Approved as EN 60038:2011
IEC 60146-1-1:2009	NOTE	Approved as EN 60146-1-1:2010 (not modified)
IEC 60146-2:1999	NOTE	Approved as EN 60146-2:2000 (not modified)
IEC 60364-1:2005	NOTE	Approved as HD 60364-1:2008 + A11:2017
IEC 61000-2-2:2002	NOTE	Approved as EN 61000-2-2:2002 (not modified)
IEC 61000-2-2:2002/A1:2017	NOTE	Approved as EN 61000-2-2:2002/A1:2017 (not modified)
IEC 61000-2-2:2002/A2:2018	NOTE	Approved as EN 61000-2-2:2002/A2:2019 (not modified)
IEC 61000-2-12:2003	NOTE	Approved as EN 61000-2-12:2003 (not modified)
IEC 61000-4-7:2002	NOTE	Approved as EN 61000-4-7:2002 (not modified)
IEC 61000-4-8:2009	NOTE	Approved as EN 61000-4-8:2010 (not modified)
IEC 61000-4-9:2016	NOTE	Approved as EN 61000-4-9:2016 (not modified)
IEC 61000-4-10:2016	NOTE	Approved as EN 61000-4-10:2017 (not modified)
IEC 61000-6-1:2016	NOTE	Approved as EN IEC 61000-6-1:2019 (not modified)

IEC 61000-6-2:2016	NOTE	Approved as EN IEC 61000-6-2:2019 (not modified)
IEC 61000-6-3:2020	NOTE	Approved as EN IEC 61000-6-3:2021 (not modified)
IEC 61000-6-4:2018	NOTE	Approved as EN IEC 61000-6-4:2019 (not modified)
IEC 61000-6-5:2015	NOTE	Approved as EN 61000-6-5:2015 (not modified)
IEC 61000-6-8:2020	NOTE	Approved as EN IEC 61000-6-8:2020 (not modified)
IEC 61140:2016	NOTE	Approved as EN 61140:2016 (not modified)
IEC 61557-8:2014	NOTE	Approved as EN 61557-8:2015 (not modified)
IEC 61400-21-1:2019	NOTE	Approved as EN IEC 61400-21-1:2019 (not modified) + A11:2020
IEC 61557-9:2014	NOTE	Approved as EN 61557-9:2015 (not modified)
IEC 61800-1:2021	NOTE	Approved as EN IEC 61800-1:2021 (not modified)
IEC 61800-2:2021	NOTE	Approved as EN IEC 61800-2:2021 (not modified)
IEC 61800-5-1:2007	NOTE	Approved as EN 61800-5-1:2007 (not modified) + A11:2021
IEC 61800-5-1:2007/A1:2016	NOTE	Approved as EN 61800-5-1:2007/A1:2017 (not modified)
CISPR 14-1:2020	NOTE	Approved as EN IEC 55014-1:2021 (not modified)
CISPR 16-2-1:2014	NOTE	Approved as EN 55016-2-1:2014 (not modified)
CISPR 16-2-1:2014/A1:2017	NOTE	Approved as EN 55016-2-1:2014/A1:2017 (not modified)
CISPR 16-2-3:2016	NOTE	Approved as EN 55016-2-3:2017 (not modified)
CISPR 16-2-3:2016/A1:2019	NOTE	Approved as EN 55016-2-3:2017/A1:2019 (not modified)
IEC 60146-1-1:2009	NOTE	Approved as EN 60146-1-1:2010 (not modified)
CISPR 11:—[1]	NOTE	Approved as EN 55011:—[2]

[1] Under preparation. Stage at the time of publication: CISPR/NFDIS 11:2022.

[2] Under preparation. Stage at the time of publication: prEN 55011:2023.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61000-2-4	2002	Electromagnetic compatibility (EMC) - Part 2-4: Environment - Compatibility levels in industrial plants for low-frequency conducted disturbances	EN 61000-2-4	2002
IEC 61000-3-2	2018	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	EN IEC 61000-3-2	2019
+ A1	2020		+ A1	2021
IEC 61000-3-3	2013	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 not subject to conditional connection	EN 61000-3-3	2013
+ A1	2017		+ A1	2019
+ A2	2021		+ A2	2021
IEC 61000-3-11	2017	Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection	EN IEC 61000-3-11	2019
IEC 61000-3-12	2011	Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤ 75 A per phase	EN 61000-3-12	2011
+ A1	2021		-	-
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009

Publication	Year	Title	EN/HD	Year
IEC 61000-4-3	2020	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN IEC 61000-4-3	2020
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2012
IEC 61000-4-5	2014	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2014
+ A1	2017		+ A1	2017
IEC 61000-4-6	2013	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2014
IEC 61000-4-11	2020	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase	EN IEC 61000-4-11	2020
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	EN 61000-4-13	2002
+ A1	2009		+ A1	2009
+ A2	2015		+ A2	2016
IEC 61000-4-28	1999	Electromagnetic compatibility (EMC) - Part 4-28: Testing and measurement techniques - Variation of power frequency, immunity test	EN 61000-4-28	2000
+ A1	2001		+ A1	2004
+ A2	2009		+ A2	2009
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	EN 61000-4-34	2007
+ A1	2009		+ A1	2009
CISPR 11 (mod)	2015	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	2016
+ A1	2016		+ A1	2017
-	-		+ A11	2020
+ A2	2019		+ A2	2021

Publication	Year	Title	EN/HD	Year
CISPR 16-1-2	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements	EN 55016-1-2	2014
+ A1	2017		+ A1	2018
CISPR 16-1-4	2019	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements	EN IEC 55016-1-4	2019
+ A1	2020		+ A1	2020
CISPR 32	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements	EN 55032	2015
+ A1	2019		+ A1	2020
-	-		+ A11	2020

IEC 61800-3

Edition 4.0 2022-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Adjustable speed electrical power drive systems – Part 3: EMC requirements and specific test methods for PDS and machine tools

Entraînements électriques de puissance à vitesse variable – Partie 3: Exigences de CEM et méthodes d'essai spécifiques pour les PDS et machines-outils

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 3: EMC requirements and specific test methods for PDS and machine tools

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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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.

IEC 61800-3 has been prepared by subcommittee 22G: Adjustable speed electric power drive systems (PDS), of IEC technical committee 22: Power electronic systems and equipment. It is an International Standard.

It has the status of a product EMC standard in accordance with IEC Guide 107.

This fourth edition cancels and replaces the third edition published in 2017. This edition constitutes a technical revision.

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

a) extension of the scope to machine tools with one or more embedded PDS;
b) extension of the frequency range for radiated immunity tests to 6 GHz;
c) general updates in the normative part and the informative annexes.

The text of this International Standard is based on the following documents:

Draft	Report on voting
22G/461/FDIS	22G/466/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under https://webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document 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 3: EMC requirements and specific test methods for PDS and machine tools

1 Scope

This part of IEC 61800 specifies electromagnetic compatibility (EMC) requirements for adjustable speed power drive systems (PDSs) and machine tools (MTs). A PDS is an AC or DC motor drive including an electronic converter. Requirements are stated for AC and DC PDSs and MTs with input and/or output voltages (line-to-line voltage), up to 35 kV AC RMS. This document applies to equipment of all power ratings.

As a product EMC standard, this document can be used for the assessment of PDS and MT. It can also be used for the assessment of complete drive modules (CDM) or basic drive modules (BDM).

NOTE 1 BDMs and CDMs are parts of the PDS which are often marketed separately.

Traction applications and electric vehicles are excluded. Equipment which is defined as group 2 in CISPR 11:2015 is excluded.

NOTE 2 Examples of group 2 equipment are:

– welding equipment (arc welding, resistance welding, etc);

– electro-discharge machining equipment (EDM).

This document does not give requirements for the electrical machine which converts power between the electrical and mechanical forms within the PDS. Requirements for rotating electrical machines are covered by the IEC 60034 series. In this document, the term "motor" is used to describe the electrical machine, whether rotary or linear, and regardless of the direction of power flow.

This document is applicable to BDMs, CDMs, PDSs and MTs with or without radio function. However, this document does not specify any radio transmission and reception requirements.

NOTE 3 It is planned that the future edition 7 of CISPR 11[1] will contain a procedure how to address radio transmission and reception requirements, which is also applicable to products in the scope of this document.

This document defines the minimum requirements for emission and immunity in the frequency range from 0 Hz to 400 GHz. Tests are not required in frequency ranges where no requirements are specified.

BDMs, CDMs, PDSs and MTs covered by this document are those installed in residential, commercial and industrial locations. Requirements are given according to the environment classification.

BDMs, CDMs and PDSs are often included in a larger system. The system aspects are not covered by this document, but guidance is provided in the informative annexes.

[1] Under preparation. Stage at the time of publication: CISPR/NFDIS 11:2022.

This document is intended as a complete product EMC standard for the EMC conformity assessment of products. As a product EMC standard for BDMs, CDMs, PDSs and MTs, according to IEC Guide 107, this document takes precedence over all aspects of the generic standards.

NOTE 4 If a PDS or MT is included as part of equipment covered by a separate product EMC standard, the separate EMC standard applies to the complete equipment.

NOTE 5 The requirements have been selected to ensure EMC for PDSs and MTs at residential, commercial and industrial locations. Changes in the EMC behaviour of a PDS or an MT as a result of fault conditions are not considered.

NOTE 6 This document 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.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61000-2-4:2002, *Electromagnetic compatibility (EMC) – Part 2-4: Environment – Compatibility levels in industrial plants for low-frequency conducted disturbances*

IEC 61000-3-2:2018, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*
IEC 61000-3-2:2018/AMD1:2020

IEC 61000-3-3:2013, *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 not subject to conditional connection*
IEC 61000-3-3:2013/AMD1:2017
IEC 61000-3-3:2013/AMD2:2021

IEC 61000-3-11:2017, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-3-12:2011, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*
IEC 61000-3-12:2011/AMD1:2021

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*
IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

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 61000-4-13:2002/AMD1:2009
IEC 61000-4-13:2002/AMD2:2015

IEC 61000-4-28:1999, *Electromagnetic compatibility (EMC) – Part 4-28: Testing and measurement techniques – Variation of power frequency, immunity test for equipment with input current not exceeding 16 A per phase*
IEC 61000-4-28:1999/AMD1:2001
IEC 61000-4-28:1999/AMD2:2009

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 61000-4-34:2005/AMD1:2009

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
CISPR 11:2015/AMD1:2016
CISPR 11:2015/AMD2:2019

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements*
CISPR 16-1-2:2014/AMD1:2017

CISPR 16-1-4:2019, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements*
CISPR 16-1-4:2019/AMD1:2020

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*
CISPR 32:2015/AMD1:2019