SLOVENSKI STANDARD
oSIST prEN IEC 62909-3:2023

01-maj-2023

Dvosmerni omrežni elektroenergetski pretvorniki - 3. del: Zahteve EMC in preskusne metode

Bi-directional grid connected power converters - Part 3: EMC requirements and test methods

Convertisseurs de puissance connectés aux réseaux bidirectionnels - Partie 3: Exigences CEM et méthodes d'essai

Ta slovenski standard je istoveten z: **prEN IEC 62909-3:2023**

ICS:

29.200	Usmerniki. Pretvorniki. Stabilizirano električno napajanje	Rectifiers. Convertors. Stabilized power supply
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

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22E/247/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 62909-3 ED1	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2023-03-03	**2023-05-26**
SUPERSEDES DOCUMENTS:	
22E/229/CD, 22E/246/CC	

IEC SC 22E : STABILIZED POWER SUPPLIES	
SECRETARIAT: Germany	SECRETARY: Mr Clemens Klemm
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 64,TC 69,TC 77,TC 82,TC 120,CIS/B	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☒ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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Recipients of this document are invited to submit, with their comments, notification of

- any relevant patent rights of which they are aware and to provide supporting documentation,
- any relevant “in some countries” clauses to be included should this proposal proceed. Recipients are reminded that the enquiry stage is the final stage for submitting "in some countries" clauses. See AC/22/2007.

TITLE:

Bi-directional grid connected power converters - Part 3: EMC requirements and test methods

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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BI-DIRECTIONAL GRID CONNECTED POWER CONVERTERS –

Part 3: EMC requirements and test methods

FOREWORD

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International Standard IEC 62909-3 has been prepared by subcommittee 22E: Stabilized power supplies, of IEC technical committee 22: Power electronic systems and equipment.

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

FDIS	Report on voting
22E/XX/FDIS	22E/XX/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

Editors note The description above must be adequately modified.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://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.

The National Committees are requested to note that for this document the stability date is 20XX..

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

INTRODUCTION

In order to optimize power consumption, for example, within the home power management, it is necessary to optimally combine electricity generation with rechargeable energy storage. This optimization is accomplished, in part, by providing an efficient transfer between DC and AC electricity to accommodate storage batteries. IEC 62909 standards describe a bidirectional grid-connected power converter (GCPC) efficiently connected for example to sources of power generation and energy storage.

IEC 62909-1 defines common general requirements, independent from the special characteristics of individual applications. IEC 62909-2 defines the additional requirements necessary for interfacing particular types of distributed energy resources to a GCPC. IEC 62909-3 presents the EMC requirements for GCPC.

GCPCs can be connected to multiple kinds of distributed energy resources. While there are EMC requirements for power electronic converters for single distributed energy resources, for example solar systems or battery storage systems, those requirements are in some cases different from each other. Hence, it is necessary to clarify which requirements should be applied to the various types of GCPCs.

BI-DIRECTIONAL GRID CONNECTED POWER CONVERTERS –

Part 3: EMC requirements and test methods

1 Scope

This part of IEC 62909 specifies electromagnetic immunity and emission requirements of bi-directional grid-connected power converters (GCPCs) consiting of a grid-side inverter with two or more DC ports on the application side with system voltages not exceeding 1 000 V AC or 1 500 V DC.

This document may also be used for special cases of GCPCs with only one DC port, where:

- GCPC with multiple physical DC ports is used in an application requiring only one DC port, or
- no dedicated product standard for such a single DC port GCPC is available.

This document considers GCPCs in both residential and non-residential environments.

This document does not cover:

- uninterruptible power supply (UPS) systems, which fall under the scope of IEC 62040 (all parts).
- power conversion equipment covered by IEC 62920, i.e. GCPCs for use in photovoltaic power systems with or without DC-coupled electrical energy storage devices
- power converters to charge batteries within electric vehicles (EVs) which fall under the scope of IEC 61851-21-2

NOTE 1 Annex A provides examples of GCPCs covered and not covered by this document.

NOTE 2 The Power Converter Subsystem (PCSS) for use in Electrical Energy Storage Systems (EESS) will be referenced in a future publication of IEC 63285. In that case, that PCSS will be added to the bulleted items above.

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 61000-2-2:2002+AMD1:2017+AMD2:2018, *Electromagnetic compatibility (EMC) - Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-2-4:2002, *Electromagnetic compatibility (EMC) - Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

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

IEC 61000-3-3:2021, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, of equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

IEC TR 61000-3-6:2008, Electromagnetic compatibility (EMC) – Part 3-6: Limits – Assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems

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 61000-3-12:2021, 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 61000-4-2:2008, *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 61000-4-5:2017, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

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 61000-4-7:2009, *Electromagnetic compatibility (EMC) – Part 4-7: Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-34:2009, *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 61000-6-1:2016, *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments*

IEC 61800-3:2017, *Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods*

IEC 61851-21-2:2018, *Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply – EMC requirements for off board electric vehicle charging systems*

IEC 62909-1:2017, *BI-DIRECTIONAL GRID CONNECTED POWER CONVERTERS – Part 1: General requirements*

IEC 62909-2:2019, *BI-DIRECTIONAL GRID CONNECTED POWER CONVERTERS – Part 2: Interface of GCPC and distributed energy resources*

IEC 62920:2021, *Photovoltaic power generating systems – EMC requirements and test methods for power conversion equipment*

IEC/TR 61000-3-14, *Electromagnetic compatibility (EMC) – Part 3-14: Assessment of emission limits for harmonics, interharmonics, voltage fluctuations and unbalance for the connection of disturbing installations to LV power systems*

CISPR 11:2019, *Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement*

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

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

352 CISPR 32:2019, *Electromagnetic compatibility of multimedia equipment – Emission*
353 *requirements*

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355

3 Terms, definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

Table 1 provides an alphabetical cross-reference listing of terms.

Table 1 – Alphabetical list of terms

Term	Term number	Term	Term number	Term	Term number
AC mains power port	3.9	electric vehicle	3.7	photovoltaic	3.21
AE	3.2	electric road vehicle	3.7	PV	3.21
AMN	3.22	EV	3.7		
associated equipment	3.2	EV section	3.8	residential location	3.3
artificial DC network	3.23				
artificial mains network	3.22	GCPC	3.1	signal and control port	3.13
auxiliary AC power port	3.10	grid-connected power converter	3.1	signal and control port	3.13
auxiliary DC power port	3.12				
		high power electronic systems and equipment	3.19	wired network port	3.14
bi-directional grid-connected power converter	3.1				
conductive power transfer port	3.15	LV	3.20		
CPT port	3.15	low voltage	3.20		
DC artificial network	3.23				
DC power port	3.11	PLC	3.16		
DC/DC converter	3.17	PLT	3.16		
DC-AN	3.23	port	3.4		
distributed energy resources	3.18	port, <in electromagnetic compatibility>	3.5		
		powerline communication	3.16		
enclosure port	3.6	powerline technology	3.16		

3.1

bi-directional grid-connected power converter
grid-connected power converter
GCPC

power converter with multiple DC ports connected to an a.c. mains power distribution network or other a.c. mains installation and used in a power generating system

Note 1 to entry: in special cases GCPCs can have only one DC power port.

Note 2 to entry: for bi-directional GCPCs the energy flow can be from AC to DC or DC to AC.

[SOURCE: CISPR 11:2015/AMD2:2019, 3.11, modified – addition of the words “with multiple DC ports” and the note has been added.]

3.2

associated equipment
AE

equipment needed to verify the functionality, to help exercise the EUT, and / or monitoring

[SOURCE: IEC 61851-21-2:2018, 3.1, modified - A word " exercise" have been replaced by " verify the functionality, to help exercise the EUT "]

3.3

residential location

area of land designated for domestic dwellings where the mains power within these locations is directly connected to the low-voltage public mains network

Note 1 to entry: Examples of residential locations are: houses, apartments, farm buildings housing people.

Note 2 to entry: A dwelling can be a single building, separate building or a separate section of a larger building.

Note 3 to entry: Within these locations it is expected to operate a radio receiver within a distance of 10 m from the equipment.

Note 4 to entry: Domestic dwellings are places for one or more people to live.

[SOURCE: IEC 61000-6-3:2020, 3.1.14]

3.4

port
access to a device or network where electromagnetic energy or signals may be supplied or received or where the device or network variables may be observed or measured
[SOURCE: IEV 131-12-60]

3.5

port, <in electromagnetic compatibility>

particular interface of the GCPC with the external electromagnetic environment

Note 1 to entry: See Figure 1 for examples of ports.

[SOURCE: IEC 61000-6-3:2020, 3.1.1, modified - A word "specified apparatus" have been replaced by "GCPC" and Figure 1 has been replaced.]