Bi-directional grid-connected power converters - Part 1: General requirements

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62909-1:2018 sisaldab Euroopa standardi EN IEC 62909-1:2018 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62909-1:2018 consists of the English text of the European standard EN IEC 62909-1:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 02.02.2018.	Date of Availability of the European standard is 02.02.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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Convertisseurs de puissance connectés aux réseaux bidirectionnels - Partie 1: Exigences générales (IEC 62909-1:2017)

Bi-direktionale netzgekoppelte Leistungsumrichter - Teil 1: Allgemeine Anforderungen (IEC 62909-1:2017)

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European foreword

The text of document 22E/182/FDIS, future edition 1 of IEC 62909-1, prepared by SC 22E "Stabilized power supplies" of IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62909-1:2018.

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)	2018-08-02
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2021-02-02

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Endorsement notice

The text of the International Standard IEC 62909-1:2017 was approved by CENELEC as a European Standard without any modification.

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.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60038 (mod)	2009	IEC standard voltages	EN 60038 [1]	2011
IEC 60146-2	1999	Semiconductor converters - Part 2: Self-commutated semiconductor converters including direct d.c. converters	EN 60146-2	2000
IEC 61000-3-2	2014	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	EN 61000-3-2	2014
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
IEC 61727	2004	Photovoltaic (PV) systems - Characteristics of the utility interface		-
IEC 62109-1	2010	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements	EN 62109-1	2010
IEC 62040-3	2011	Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements	EN 62040-3	2011
IEC 62477-1	2012	Safety requirements for power electronic converter systems and equipment - Part 1: General	EN 62477-1	2012
			+A11	2014
+A1	2016		+A1	2017

[1] The title of EN 60038 is "CENELEC standard voltages".

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INTRODUCTION

The solution to global warming and fossil fuel depletion requires an expansion of renewable energy and the spread of distributed energy resources, with the new infrastructure containing micro-grids and smaller-scale nano-grids. Nano-grid systems are especially suited to increasing energy-usage efficiency and reducing power consumption of homes by combining and optimally controlling energy storage with generators.

In order to optimize the power consumption within the nano-grid of a home, it is necessary to supply the electricity its residents require by combining and optimizing an electricity generator with rechargeable energy storage. Independent generators and battery storage units are already on the market; but, for such new systems, development has just started. Although power generation sources and storage batteries are generally expensive, the tendency of that is still more remarkable in the early stage in which a market is formed. For stable growth of a market, extendibility, compatibility, and robustness of such system are especially important. If a connecting interface is standardized and compatibility is insured, many products can be put onto the market and their prices can be kept at a proper level. If a new standard is utilized for product certification, their broad acceptance can be earlier and greater. From the above viewpoint, it is necessary to promptly advance standardization of bi-directional grid-connected power converter (GCPC) which combined the source of power generation and the storage battery. This part of IEC 62909 provides common general requirements independent of special characteristics of individual applications.

BI-DIRECTIONAL GRID-CONNECTED POWER CONVERTERS –

Part 1: General requirements

1 Scope

This part of IEC 62909 specifies general aspects of bi-directional grid-connected power converters (GCPC), consisting of a grid-side inverter with two or more types of DC-port interfaces on the application side with system voltages not exceeding 1 000 V AC or 1 500 V DC. In special cases, a GCPC will have only one DC-port interface, which is connected to a bidirectional energy-storage device. This document includes terminology, specifications, performance, safety, system architecture, and test-case definitions. The "system architecture" defines interaction between the inverter and converters. Requirements which are common, general, and independent of special characteristics of individual generators and bi-directional storages are defined.

This document does not cover uninterruptible power supply (UPS) systems, which fall under the scope of IEC 62040 (all parts). Requirements for internal and external digital communication might be necessary; the interface requirements including communication with distributed energy resources are provided in a future part of IEC 62909. All EMC requirements are defined by reference to existing IEC standards. External communication requirements are out of scope of this document.

NOTE The control signal from the grid is not defined in this document.

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 60038:2009*, IEC standard voltages*

IEC 60146-2:1999, *Semiconductor converters – Part 2: Self-commutated semiconductor converters including direct d.c converters*

IEC 61000-3-2:2014, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

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 61727:2004, *Photovoltaic (PV) systems – Characteristics of the utility interface*

IEC 62109-1:2010, *Safety of power converters for use in photovoltaic power systems – Part 1: General requirements*

IEC 62040-3:2011, *Uninterruptible power systems (UPS) – Part 3: Method of specifying the performance and test requirements*