

<b>STN</b>	<b>Obojsmerné výkonové meniče pripojené na elektrickú sieť</b> <b>Časť 1: Všeobecné a bezpečnostné požiadavky</b>	<b>STN</b> <b>EN IEC 62909-1</b>  33 4211
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Bi-directional grid-connected power converters - Part 1: General and safety requirements

Táto norma obsahuje anglickú verziu európskej normy.

This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 11/25

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN IEC 62909-1**

September 2025

ICS 29.200

Supersedes EN IEC 62909-1:2018

English Version

**Bi-directional grid-connected power converters - Part 1: General  
and safety requirements  
(IEC 62909-1:2025)**

Convertisseurs de puissance connectés aux réseaux  
bidirectionnels - Partie 1: Exigences générales et de  
sécurité  
(IEC 62909-1:2025)

Bidirektionale netzgekoppelte Leistungsumrichter - Teil 1:  
Allgemeine- und Sicherheitsanforderungen  
(IEC 62909-1:2025)

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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**

**EN IEC 62909-1:2025 (E)****European foreword**

The text of document 22E/288/FDIS, future edition 2 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 62909-1:2025.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2026-09-30 level by publication of an identical national standard or by endorsement
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In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 61851 series	NOTE	Approved as EN IEC 61851 series
IEC 61851-23:2023	NOTE	Approved as EN IEC 61851-23:— (not modified) <sup>1</sup>
IEC 62040 series	NOTE	Approved as EN 62040 series
IEC 62040-1:2017	NOTE	Approved as EN IEC 62040-1:2019 (not modified) +A11:2021
IEC 62109 series	NOTE	Approved as EN IEC 62109 series
IEC 62109-2:2011	NOTE	Approved as EN 62109-2:2011 (not modified)

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<sup>1</sup> Under preparation. Stage at the time of publication: FprEN IEC 61851-23:2025.

## 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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60038 (mod)	2009	IEC standard voltages	EN 60038	2011
+ A1	2021		-	-
IEC 60146-2	1999	Semiconductor converters - Part 2: Self-commutated semiconductor converters including direct d.c. converters	EN 60146-2	2000
IEC 62040-3	2021	Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements	EN IEC 62040-3	2021
IEC 62109-1	2010	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements	EN 62109-1	2010
IEC 62477-1	2022	Safety requirements for power electronic converter systems and equipment - Part 1: General	EN IEC 62477-1	2023
IEC/TS 62786-1	2023	Distributed energy resources connection with the grid - Part 1: General requirements	-	-



IEC 62909-1

Edition 2.0 2025-07

# INTERNATIONAL STANDARD

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**Bi-directional grid-connected power converters –  
Part 1: General and safety requirements**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

## FOREWORD

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IEC 62909-1 has been prepared by subcommittee 22E: Stabilized power supplies, of IEC technical committee 22: Power electronic systems and equipment. It is an International Standard.

This second edition replaces the first 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) the title has been changed by adding the wording "and safety";
- b) the scope has been changed in order to clarify the bi-directional grid-connected power converters (GCPs) covered by this document.

## IEC 62909-1:2025 © IEC 2025

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

Draft	Report on voting
22E/288/FDIS	22E/292/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts in the IEC 62909 series, published under the general title *Bi-directional grid-connected power converters*, 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 [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

## IEC 62909-1:2025 © IEC 2025

## INTRODUCTION

The solution to global warming and fossil fuel depletion requires an expansion of renewable energy and the spread of distributed energy sources. For example, energy management systems are especially suited to increasing energy-usage efficiency and reducing power consumption of residential and commercial.

In order to optimize the power consumption within the home power management, it is important to optimally combine electricity generation with rechargeable energy storage such as electric vehicles and battery systems. This optimization is accomplished, in part, by providing an efficient transfer between DC and AC electricity to accommodate storage batteries. The IEC 62909 series describes a bi-directional grid-connected power converter (GCPC) efficiently connected to sources of power generation and energy storage.

This document provides common general and safety requirements independent of special characteristics of individual applications.

## IEC 62909-1:2025 © IEC 2025

## 1 Scope

This part of IEC 62909 specifies general and safety aspects of bi-directional grid-connected power converters (GCPC), consisting of a grid-side inverter with two or more types of DC power ports on the application side with system voltages not exceeding 1 000 V AC or 1 500 V DC.

This document can also be used for the special case of a multiple DC power port GCPC used in an application requiring only one DC power port.

This document considers general aspects such as terminology, specifications, performance, system architecture, as well as safety requirements.

This document does not cover

- uninterruptible power supply (UPS) systems, which fall under the scope of the IEC 62040 series,
- power conversion equipment for use in photovoltaic systems, which fall under the scope of the IEC 62109 series, and
- bi-directional power converters to charge or discharge the batteries located within electric vehicles or in the charging station, which fall under the scope of the IEC 61851 series.

NOTE 1 The external system (e.g. energy management system, utility operations system) is not defined in this document.

NOTE 2 The power converter sub-system case for use in electrical energy storage systems is currently covered by this document but will be covered by the IEC 63285 series<sup>1</sup>.

NOTE 3 Annex A provides examples of GCPCs. These examples contain GCPCs covered and not covered by 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 60038:2009/AMD1:2021

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

IEC 62040-3:2021, *Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements*

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

IEC 62477-1:2022, *Safety requirements for power electronic converter systems and equipment - Part 1: General*

IEC TS 62786-1:2023, *Distributed energy resources connection with the grid - Part 1: General requirements*

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<sup>1</sup> Under preparation.