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Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 62109-2:2011 sisaldab Euroopa standardi EN 62109-2:2011 ingliskeelset teksti.	This Estonian standard EVS-EN 62109-2:2011 consists of the English text of the European standard EN 62109-2:2011.
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62109-2

September 2011

ICS 27.160

English version

Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters

(IEC 62109-2:2011)

Sécurité des convertisseurs de puissance utilisés dans les systèmes photovoltaïques -
Partie 2: Exigences particulières pour les onduleurs
(CEI 62109-2:2011)

Sicherheit von Leistungsumrichtern zur Anwendung in photovoltaischen Energiesystemen -
Teil 2: Besondere Anforderungen an Wechselrichter
(IEC 62109-2:2011)

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CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

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Ref. No. EN 62109-2:2011 E

Foreword

The text of document 82/636/FDIS, future edition 1 of IEC 62109-2, prepared by IEC TC 82, "Solar photovoltaic energy systems", was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62109-2 on 2011-07-28.

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

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)	2012-04-28
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-07-28

The requirements in this Part 2 are to be used with the requirements in Part 1, and supplement or modify clauses in Part 1. When a particular clause or subclause of Part 1 is not mentioned in this Part 2, that clause of Part 1 applies. When this Part 2 contains clauses that add to, modify, or replace clauses in Part 1, the relevant text of Part 1 is to be applied with the required changes.

Subclauses, figures and tables additional to those in Part 1 are numbered in continuation of the sequence existing in Part 1.

All references to “Part 1” in this Part 2 shall be taken as dated references to EN 62109-1:2010.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62109-2:2011 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 standards indicated:

IEC 60364-7-712	NOTE	Harmonized as HD 60364-7-712.
IEC 61008-1	NOTE	Harmonized as EN 61008-1.
IEC 61727	NOTE	Harmonized as EN 61727.
IEC 61730-1	NOTE	Harmonized as EN 61730-1.
IEC 62116	NOTE	Harmonized as EN 62116.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Addition *to EN 62109-1:2010:*

Publication	Year	Title	EN/HD	Year
IEC 62109-1	2010	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements	EN 62109-1	2010

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INTRODUCTION

This Part 2 of IEC 62109 gives requirements for grid-interactive and stand-alone inverters. This equipment has potentially hazardous input sources and output circuits, internal components, and features and functions, which demand different requirements for safety than those given in Part 1 (IEC 62109-1:2010).

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SAFETY OF POWER CONVERTERS FOR USE IN PHOTOVOLTAIC POWER SYSTEMS –

Part 2: Particular requirements for inverters

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1 Scope and object

This clause of Part 1 is applicable with the following exception:

1.1 Scope

Addition:

This Part 2 of IEC 62109 covers the particular safety requirements relevant to d.c. to a.c. inverter products as well as products that have or perform inverter functions in addition to other functions, where the inverter is intended for use in photovoltaic power systems.

Inverters covered by this standard may be grid-interactive, stand-alone, or multiple mode inverters, may be supplied by single or multiple photovoltaic modules grouped in various array configurations, and may be intended for use in conjunction with batteries or other forms of energy storage.

Inverters with multiple functions or modes shall be judged against all applicable requirements for each of those functions and modes.

NOTE Throughout this standard where terms such as “grid-interactive inverter” are used, the meaning is either a grid-interactive inverter or a grid-interactive operating mode of a multi-mode inverter

This standard does not address grid interconnection requirements for grid-interactive inverters.

NOTE The authors of this Part 2 did not think it would be appropriate or successful to attempt to put grid interconnection requirements into this standard, for the following reasons:

a) Grid interconnection standards typically contain both protection and power quality requirements, dealing with aspects such as disconnection under abnormal voltage or frequency conditions on the grid, protection against islanding, limitation of harmonic currents and d.c. injection, power factor, etc. Many of these aspects are power quality requirements that are beyond the scope of a product safety standard such as this.

b) At the time of writing there is inadequate consensus amongst regulators of grid-interactive inverters to lead to acceptance of harmonized interconnect requirements. For example, IEC 61727 gives grid interconnection requirements, but has not gained significant acceptance, and publication of EN 50438 required inclusion of country-specific deviations for a large number of countries.

c) The recently published IEC 62116 contains test methods for islanding protection.

This standard does contain safety requirements specific to grid-interactive inverters that are similar to the safety aspects of some existing national grid interconnection standards.

Users of this standard should be aware that in most jurisdictions allowing grid interconnection of inverters there are national or local requirements that must be met. Examples include EN 50438, IEEE 1547, DIN VDE 0126-1-1, and AS 4777.3

2 Normative references

This clause of Part 1 is applicable, with the following exception:

Addition

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

3 Terms and definitions

This clause of Part 1 is applicable, with the following exceptions:

Additional definitions

3.100
functionally grounded array
a PV array that has one conductor intentionally connected to earth for purposes other than safety, by means not complying with the requirements for protective bonding

NOTE 1 Such a system is not considered to be a grounded array – see 3.102.

NOTE 2 Examples of functional array grounding include grounding one conductor through an impedance, or only temporarily grounding the array for functional or performance reasons

NOTE 3 In an inverter intended for an un-grounded array, that uses a resistive measurement network to measure the array impedance to ground, that measurement network is not considered a form of functional grounding.

3.101
grid-interactive inverter
an inverter or inverter function intended to export power to the grid

NOTE Also commonly referred to as “grid-connected”, “grid-tied”, “utility-interactive”. Power exported may or may not be in excess of the local load.

3.102
grounded array
a PV array that has one conductor intentionally connected to earth by means complying with the requirements for protective bonding

NOTE 1 The connection to earth of the mains circuit in a non-isolated inverter with an otherwise ungrounded array, does not create a grounded array. In this standard such a system is an ungrounded array because the inverter electronics are in the fault current path from the array to the mains grounding point, and are not considered to provide reliable grounding of the array

NOTE 2 This is not to be confused with protective earthing (equipment grounding) of the array frame

NOTE 3 In some local installation codes, grounded arrays are allowed or required to open the array connection to earth under ground-fault conditions on the array, to interrupt the fault current, temporarily ungrounding the array under fault conditions. This arrangement is still considered a grounded array in this standard.

3.103
indicate a fault
annunciate that a fault has occurred, in accordance with 13.9

3.104
inverter
electric energy converter that changes direct electric current to single-phase or polyphase alternating current

3.105
inverter backfeed current
the maximum current that can be impressed onto the PV array and its wiring from the inverter, under normal or single fault conditions

3.106
isolated inverter
an inverter with at least simple separation between the mains and PV circuits

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