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Photovoltaic power generating systems - EMC requirements and test methods for power conversion equipment

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 62920:2017 sisaldab Euroopa standardi EN 62920:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 62920:2017 consists of the English text of the European standard EN 62920:2017.
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Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.10.2017.	Date of Availability of the European standard is 13.10.2017.
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European foreword

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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)	2018-05-30
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-08-30

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60364-1:2005	NOTE	Harmonized as HD 60364-1:2008.
IEC 60974-10	NOTE	Harmonized as EN 60974-10.
IEC 61000 (series)	NOTE	Harmonized as EN 61000 (series).
IEC 61800-3	NOTE	Harmonized as EN 61800-3.
IEC 61851-21-2[1)]	NOTE	Harmonized as FprEN 61851-21-2.
IEC 62040-2	NOTE	Harmonized as EN 62040-2.

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

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Systèmes de production d'énergie photovoltaïque – Exigences de CEM et méthodes d'essai pour les équipements de conversion de puissance

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PHOTOVOLTAIC POWER GENERATING SYSTEMS – EMC REQUIREMENTS AND TEST METHODS FOR POWER CONVERSION EQUIPMENT

FOREWORD

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International Standard IEC 62920 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

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FDIS	Report on voting
82/1288/FDIS	82/1313/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.

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

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INTRODUCTION

Background

Power conversion equipment (PCE) is indispensable for solar photovoltaic power energy systems in order to convert the DC electric power energy generated by solar photovoltaic panels into AC electric power, and to feed the AC power energy into the AC mains network or loads.

In recent years, standardization of EMC requirements for PCE has become more active. For example, CISPR/B has been considering the limits and measurement method for conducted disturbances at DC power ports of grid connected power converters since 2008. These proposed limits and measurement methods form the basis of the instructions for supplementing CISPR 11 in order to cover the set of EMC requirements for the PCE applying to the solar photovoltaic power energy systems. EMC requirements for PCE were added in CISPR 11 Ed.6.0 which was published in 2015. Some product committees, which consider products utilizing PCE, have their own product standards on EMC requirements. SC 22G has developed IEC 61800-3 to define the limits and test methods for power drive systems. SC 22H has IEC 62040-2 for uninterrupted power supplies, and TC 26 has IEC 60974-10 for arc welding. TC 9 sets the emission limits with IEC 62236 (all parts). Moreover, TC 69 will have IEC 61851-21-2 [1] covering EMC requirements for conducted charging stations for electric vehicles.

Purpose of the development of a product EMC standard

IEC Guide 107 specifies that TC 77 and CISPR have responsibility for developing the basic and generic standards for EMC requirements of products. Therefore, product committees are not free to set their own emission limits. If product committees intend to require immunity to particular disturbances, they shall refer to these basic EMC immunity standards.

However, when the EMC standards which are developed by TC 77 and CISPR are not considered suitable for a particular product or electromagnetic environment, product committees shall seek their assistance and advice for any change in the emission limits and/or measurement requirements.

Product committees are responsible for selecting the appropriate immunity test items and levels for their products as well as for defining the relevant performance criteria for the evaluation of the immunity test results. Consequently, product committees, such as TC 22, TC 26, TC 9, and TC 69, have their own EMC standard to define EMC limits and test methods for their products.

On the other hand, TC 82 does not have its own product EMC standards. Therefore, TC 82 has to refer to the generic standards. Nevertheless, TC 82 has the responsibility to consider EMC requirements for PCE applying to the solar photovoltaic power energy systems, and TC 82 can take action as follows to develop its own product EMC standards:

a) select the immunity test items in accordance with EMC environments for the solar photovoltaic power energy systems;

b) supplement generic standards with a detailed description of test conditions and test set up;

c) propose the conditional limits and alternative test methods in terms of installation environmental and operational conditions;

d) develop appropriate requirements and test method for high power equipment.

This document presents the minimum EMC requirements for PCE applying to solar photovoltaic power energy systems.

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1 Under preparation. Stage at the time of publication: IEC AFDIS 61851-21-2:2017.

PHOTOVOLTAIC POWER GENERATING SYSTEMS – EMC REQUIREMENTS AND TEST METHODS FOR POWER CONVERSION EQUIPMENT

1 Scope

This document specifies electromagnetic compatibility (EMC) requirements for DC to AC power conversion equipment (PCE) for use in photovoltaic (PV) power systems.

The PCE covered by this document can be grid-interactive, which is termed as a grid connected power converter (GCPC), or stand-alone. It can be supplied by single or multiple photovoltaic modules grouped in various array configurations, and can be intended for use in conjunction with batteries or other forms of energy storage.

NOTE A micro inverter is an example of a GCPC supplied by a single photovoltaic module.

This document covers not only PCE connected to a public low voltage AC mains network or other low voltage AC mains installation, but also PCE connected to a medium or high voltage AC network with or without step-down power transformers. Requirements for the PCE connected to a medium or high voltage AC network are specified in this document. However, some requirements relevant to grid interconnection are addressed with other standards specifying power quality or their own grid codes in some countries.

NOTE DC/DC converters used for PV systems are not yet covered in this document. They can cause electromagnetic interference due to conducted disturbances at DC ports.

PCE is assessed with EMC requirements as a type test at a test site. This document provides test methods and test conditions for PCE as well as emission and immunity requirements, but not for photovoltaic modules and other balance of system components.

When compliance with EMC requirements at the test site cannot be shown due to technical reasons of the test site, PCE can be assessed in situ, such as at the manufacturer's premises or in the field where the PCE is assembled into a PV power system. However, only high frequency emission requirements for in situ assessment are specified in CISPR 11.

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

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 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 61000-3-11:2000, *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 TR 61000-3-14:2011, *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*

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

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*
IEC 61000-4-3:2006/AMD1:2007
IEC 61000-4-3:2006/AMD2:2010

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

IEC 61000-4-7:2002, *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 61000-4-7:2002/AMD1:2008

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

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*

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

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 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

3 Terms and definitions

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