SLOVENSKI STANDARD
oSIST prEN IEC 63349-1:2025

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Fotonapetostni krmilniki naprav z neposrednim pogonom - 1. del: Splošne zahteve

Photovoltaic direct-driven appliance controllers - Part 1: General requirement

Ta slovenski standard je istoveten z: **prEN IEC 63349-1:2024**

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oSIST prEN IEC 63349-1:2025 **en,fr,de**

82/2291/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 63349-1 ED1**	
DATE OF CIRCULATION: **2024-09-27**	CLOSING DATE FOR VOTING: **2024-12-20**
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IEC TC 82 : SOLAR PHOTOVOLTAIC ENERGY SYSTEMS	
SECRETARIAT: United States of America	SECRETARY: Mr George Kelly
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED: Energy Efficiency,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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TITLE:

Photovoltaic direct-driven appliance controllers - Part 1: General requirement

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

This project was discussed and supported by WG6 during their meeting in 2024-04.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PHOTOVOLTAIC DIRECT-DRIVEN APPLIANCE CONTROLLOERS

Part 1: General requirements

FOREWORD

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

Draft	Report on voting
XX/XX/FDIS	XX/XX/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. The main document types developed by IEC are described in greater detail at http://www.iec.ch/standardsdev/publications.

123 The committee has decided that the contents of this document will remain unchanged until the
124 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
125 specific document. At this date, the document will be

126 • reconfirmed,
127 • withdrawn,
128 • replaced by a revised edition, or
129 • amended.

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PHOTOVOLTAIC DIRECT-DRIVEN APPLIANCE CONTROLLERS-

Part 1: General requirements

1 Scope

IEC 63349 series documents establish requirements for photovoltaic direct-driven appliance (PVDDA) controllers. The requirements are applicable to systems with voltages not higher than 1500V DC or 1000V AC, and where the output power of variable frequency drive (VFD) not higher than 30kW.

PVDDA controllers are devices used for transforming, regulating and controlling power among sources (such as PV array, grid, energy storage, etc.) and appliance loads (such as air-conditioner, refrigerator, water pump, etc.). Through a PVDDA controller, power generated by PV system is directly applied to the load, with or without a connection to the grid. PVDDA controllers shall communicate with connected power converters and power sources, but communication protocols are not covered in this document.

A PVDDA controller may be connected to multiple power converters such as: a Maximum Power Point Tracking (MPPT) system, a VFD, a bi-directional grid-connected AC/DC power converter, an energy storage charger/discharger, and converters for DC or AC appliances, etc. However, many of these devices have their own applicable standards, therefore this document does not intend to create any new requirements for these devices. Instead, it covers the control functions and the operational performance between the controller and these power converters.

Safety requirements of the PVDDA controller are not covered by this document. Safety requirements of power converters connected to the PVDDA controller are listed as follows:

a) converter connected to PV array, IEC 62109-1 and IEC 62109-2 is applicable;

b) bi-directional converter connected to grid, IEC 62909-1 and IEC 62909-2 is applicable;

c) converter connected to energy storage, IEC 62509 is applicable;

d) variable frequency drive, IEC 60730-1 is applicable.

Characterization and testing of the PVDDA controller's efficiency are not included in the scope of this part of the document. They will be included in part 3 of this document (under development).

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 *IEC standard voltages*

IEC 60068-2-6 *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC TS 61836, *Solar photovoltaic energy systems - Terms, definitions and symbols*

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

IEC 62109-2, *Safety of power converters for use in photovoltaic power systems – Part 2: Particular requirements for inverters*

IEC TS 62786-1, *Distributed energy resources connection with the grid*

IEC TS 62786-3, *Distributed energy resources connection with the grid – Part 3: Additional requirements for stationary battery energy storage system*

IEC 62891, *Maximum power point tracking efficiency of grid connected photovoltaic inverters*

IEC 62909-1, *Bi-directional grid-connected power converters – Part 1: General requirements*

IEC 62909-2, *Bi-directional grid-connected power converters – Part 2: Interface of GCPC and distributed energy resources*

IEC TS 63106-1, *Simulators used for testing of photovoltaic power conversion equipment – Recommendations – Part 1: AC power simulators*

IEC TS 63106-2, *Simulators used for testing of photovoltaic power conversion equipment – Recommendations – Part 2: DC power simulators*

IEC TS 63349-2, Photovoltaic direct-driven appliance controllers – Part 2: Operation modes *and graphic display*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TS 61836 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

3.1
PV direct-driven appliance (PVDDA)
appliance which directly uses DC electrical power generated by a PV array, and which may be connected to the electrical grid, energy storage devices, or other sources and loads.

3.2
PV direct-driven appliance (PVDDA) controller
device of PVDDA used for power transformation, power regulation and power control

3.3
variable frequency drive (VFD)
class of drive products that seek to control the speed of a motor, typically an induction motor, through a proportional relationship between drive output voltage and commanded output frequency

[SOURCE: IEC 61800-7-202:2015, 3.1.52]

3.4
curtailment
reduction of the active power output of renewable energy generating units or power plants below the maximum which could be fed into an electric power network in the prevailing conditions

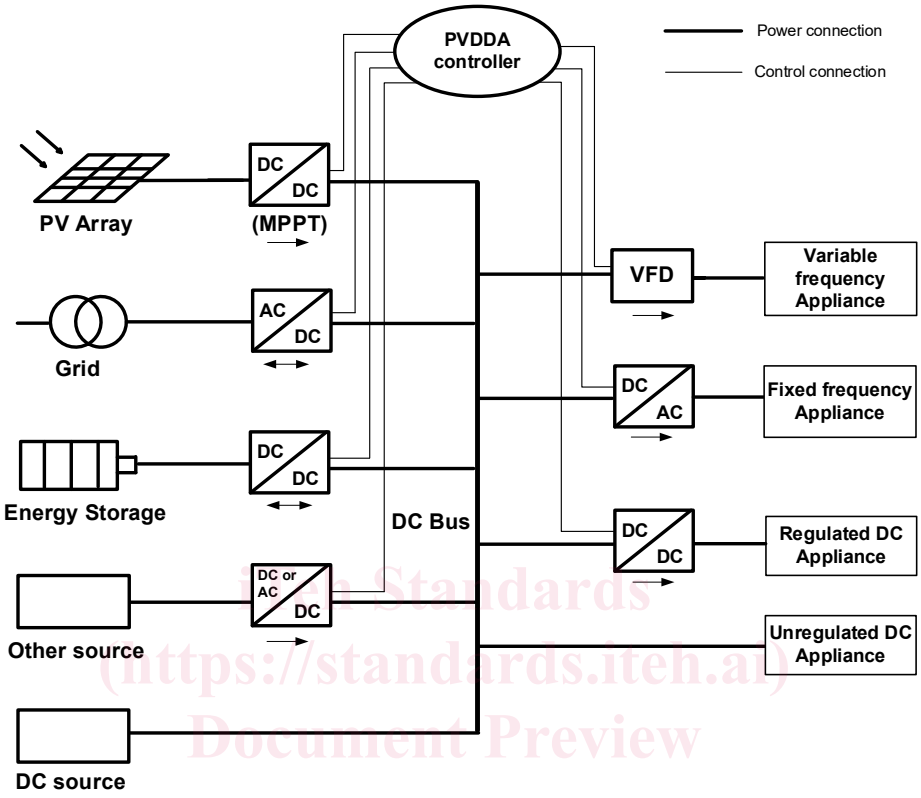
[SOURCE: IEC 62934:2021, 3.7.5]

3.5
load management
reduction or disconnection of power usage from grid, either automatically or manually (usually as requested by the electric power network operator)

3.6
commanded output frequency of VFD
the target frequency of the VFD proportional to the required load value

4 Schematic drawing of PVDDA controller applications

The PVDDA controller is applied in a PV system which may be configured with a PV array, grid, energy storage, DC source, other sources and appliances. The schematic drawing is shown in Figure 1.



Note: Regulated DC appliance refers to an appliance which is connected to a DC-DC converter and is usually sensitive to the voltage deviation; unregulated DC appliance refers to an appliance which is directly connected to the DC bus and is insensitive to voltage deviation.

Figure 1 – Schematic drawing of PVDDA controller (including all options)

PVDDA controllers can be applied for different equipment configurations. Typical configurations are classified as following (see definitions in IEC TS 63349-2):

Equipment configuration PA: equipment configuration includes PV array and appliances, see Figure 2.

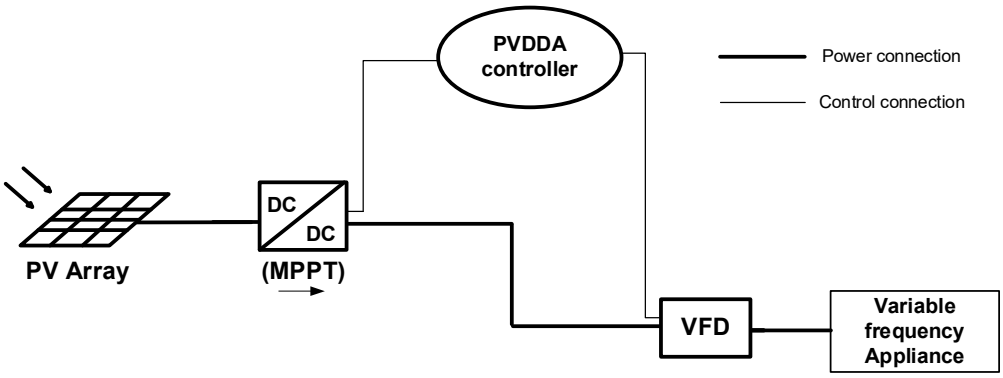


Figure 2 – PVDDA controller applied for equipment configuration PA

Equipment configuration PAG: equipment configuration includes PV array, grid and appliances, see Figure 3.