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

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IEC 63349-1 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems. It is an International standard.

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

Draft	Report on voting
82/2501/FDIS	82/2533/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 www.iec.ch/publications.

A list of all parts in the IEC 63349 series, published under the general title *Photovoltaic direct-driven appliance controllers*, 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 in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

1 Scope

This part of IEC 63349 establishes control functions and operational performance requirements for photovoltaic direct-driven appliance (PVDDA) controllers.

PVDDA controllers are devices used for controlling power among power sources (such as a PV array, grid, energy storage, etc.) and appliances (such as an air-conditioner, refrigerator, water pump, etc.). Through a PVDDA controller, the power generated by a PV array is directly supplied to appliances. The PVDDA controller also controls the appliances and has internal communication. The PVDDA controller can have external communication with connected power sources and appliances, but communication protocols are not covered in this document.

A PVDDA controller is built in or integrated with a control center, a maximum power point tracking (MPPT) system, and one or multiple converters connected to appliances. The controller can also include a bi-directional grid-connected AC/DC power converter, an energy storage charger/discharger, etc. However, many of these devices have their own applicable standards, therefore this document does not intend to create any new requirements for these individual devices.

The requirements for PVDDA controllers are applicable to systems with voltages not higher than 1 500V DC or 1 000V AC. Safety and EMC requirements for the PVDDA controllers are under consideration and not covered by this document. Safety requirements for power converters connected to a PVDDA controller are listed as follows:

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

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

c) for converter connected to energy storage, IEC 62477-1 and IEC 62509 are applicable;

d) for variable frequency drive, IEC 61800-5-1 is applicable.

Performance requirements for each individual power converter connected to a PVDDA controller refer to IEC 62093.

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

IEC 62093:2022, *Photovoltaic system power conversion equipment - Design qualification and type approval*

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

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

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*

Bibliography

IEC 60038:2009, *IEC standard* voltages
IEC 60038:2009/AMD1:*2021*

IEC 61800-5-1, *Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy*

IEC 61800-7-202:2015, *Adjustable speed electrical power drive systems - Part 7-202: Generic interface and use of profiles for power drive systems - Profile type 2 specification*

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

IEC 62509, *Battery charge controllers for photovoltaic systems - Performance and functioning*

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 62934:2021, *Grid integration of renewable energy generation - Terms and definitions*

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

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