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CONSOLIDATED VERSION

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Photovoltaic systems – Design qualification of solar trackers

Systèmes photovoltaïques – Qualification de conception des suiveurs solaires

IEC 62817:2014-08+AMD1:2017-07 CSV(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PHOTOVOLTAIC SYSTEMS – DESIGN QUALIFICATION OF SOLAR TRACKERS

FOREWORD

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IEC 62817 edition 1.1 contains the first edition (2014-08) [documents 82/853/FDIS and 82/877/RVD] and its amendment 1 (2017-07) [documents 82/1018/CDV and 82/1097/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 62817 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

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

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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PHOTOVOLTAIC SYSTEMS – DESIGN QUALIFICATION OF SOLAR TRACKERS

1 Scope and object

This International Standard is a design qualification standard applicable to solar trackers for photovoltaic systems, but may be used for trackers in other solar applications. The standard defines test procedures for both key components and for the complete tracker system. In some cases, test procedures describe methods to measure and/or calculate parameters to be reported in the defined tracker specification sheet. In other cases, the test procedure results in a pass/fail criterion.

The objective of this design qualification standard is twofold.

First, this standard ensures the user of the said tracker that parameters reported in the specification sheet were measured by consistent and accepted industry procedures. This provides customers with a sound basis for comparing and selecting a tracker appropriate to their specific needs. This standard provides industry-wide definitions and parameters for solar trackers. Each vendor can design, build, and specify the functionality and accuracy with uniform definition. This allows consistency in specifying the requirements for purchasing, comparing the products from different vendors, and verifying the quality of the products.

Second, the tests with pass/fail criteria are engineered with the purpose of separating tracker designs that are likely to have early failures from those designs that are sound and suitable for use as specified by the manufacturer. Mechanical and environmental testing in this standard is designed to gauge the tracker's ability to perform under varying operating conditions, as well as to survive extreme conditions. Mechanical testing is not intended to certify structural and foundational designs, because this type of certification is specific to local jurisdictions, soil types, and other local requirements.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 60068-2-21, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60904-3:2008, *Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 12103-1, *Road vehicles – Test dust for filter evaluation – Part 1: Arizona test dust*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. For additional tracker-specific terminology, see Clause 6.

3.1
photovoltaics
PV
devices that use solar radiation to directly generate electrical energy

3.2
concentrator photovoltaics
CPV
devices that focus magnified sunlight on photovoltaics to generate electrical energy. The sunlight could be magnified by various different methods, such as reflective or refractive optics, in dish, trough, lens, or other configurations

3.3
concentrator module
CPV module
group of receivers (PV cells mounted in some way), optics, and other related components, such as interconnections and mechanical enclosures, integrated together into a modular package. The module is typically assembled in a factory and shipped to an installation site to be installed along with other modules on a solar tracker

Note 1 to entry: The module is typically assembled in a factory and shipped to an installation site to be installed along with other modules on a solar tracker.

Note 2 to entry: A CPV module typically does not have a field-adjustable focus point. In addition, a module could be made of several sub-modules. The sub-module is a smaller, modular portion of the full-size module, which might be assembled into the full module either in a factory or in the field.

3.4
concentrator assembly
concentrator assembly consisting of receivers, optics, and other related components that have a field-adjustable focus point and are typically assembled and aligned in the field

EXAMPLE: A system that combines a single large dish with a receiver unit that is aligned with the focal point of the disk.

Note 1 to entry: This term is used to differentiate certain CPV designs from the CPV modules mentioned above.

4 Specifications for solar trackers for PV applications

The manufacturer shall provide the test lab, as part of its product marking and documentation, a table in the form specified below (see Table 1). The third column of Table 1 is for information purposes regarding this standard and is not intended to be part of an actual specification template provided to the test lab. See later clauses/subclauses of this standard for further explanation of individual specifications.

Some of the specifications within Table 1 are required to be provided by the manufacturer and verified by the test lab, whereas others are the sole responsibility of the test lab. Still other specifications in Table 1 are optional; however, if a tracker manufacturer chooses to include optional information, it shall be reported and measured in the specific way shown in Table 1 (and in some cases, reporting requirements are further described in the appropriate clause of this standard). Refer to the third column of Table 1 to determine the responsibility of the specification or optional status ("T" indicates test lab responsibility, "M" indicates manufacturer responsibility, and "O" indicates an optional parameter).

Table 1 – Tracker specification template

Characteristic	Example	Responsibility/Clause/Subclause
Manufacturer	The XYZ Company	(M)
Model number	XX1090	(M)
Type of tracker	CPV Tracker, Dual Axis	(M) 6.2, 6.3
Payload characteristics		
Minimum/maximum mass supported	100 kg/1 025 kg	(M) 6.8.3
Payload center of mass restrictions	0 m to 0,3 m distance perpendicular to mounting surface	(M) 6.8.3
Maximum payload surface area	30 m^2	(M) 6.8.3
Nominal payload surface area	28 m^2	(M)
Maximum dynamic torques allowed while moving	Azimuth (Θ_z):10 kN m Θ_x, Θ_y: 5 kN m [shall provide a set of diagrams to clarify torques and which axes they are relative to]	(M) 8.4.5
Maximum static torques allowed while in stow position	[shall provide a set of diagrams]	(M) 8.4.4, 8.4.5
Installation characteristics		
Allowable foundation	Reinforced concrete	(M) 6.6.2
Foundation tolerance in primary axis	± 0,5°	(O) 6.9
Foundation tolerance in secondary axis	± 0,5°	(O) 6.9
Installation effort	5 man-hours, 40 metric ton crane	(O) 6.8.8
Payload interface flexibility	The interface can be configured to mount modules from manufacturers "A", "B", and "C". Bolting configurations "X", "Y", and "Z" are allowable.	(O)
Electrical characteristics		
Includes backup power?	No	(M) N/A
Daily energy consumption	1,5 kWh	(T) 6.7.1
Stow energy consumption	1 kWh	(T) 6.7.2
Input power requirements	AC, 100 V to 240 V, 50 Hz to 60 Hz, 5 A	(M) No specifics defined
Effective (and apparent) peak power consumption tracking	500 W (550 VA)	(T) 8.3.2
Effective (and apparent) peak power consumption non-tracking	50 W (55 VA)	(T) 8.3.2
Effective (and apparent) peak power consumption stow positioning.	1 000 W (1 100 VA)	(T) 8.3.3