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Erirakendustel, sealhulgas alalisvoolul kasutatavad
liigpingekaitsevahendid. Osa 11: Nõuded fotoelektriliste
rakenduste liigpingekaitsevahenditele ja nende
katsetamine**

**Low-voltage surge protective devices - Surge protective
devices for specific application including d.c. - Part 11:
Requirements and tests for SPDs in photovoltaic
applications**

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**Low-voltage surge protective devices -
Surge protective devices for specific application including d.c. -
Part 11: Requirements and tests for SPDs in photovoltaic applications**

Parafoudres basse tension -
Parafoudres pour applications spécifiques
incluant le courant continu -
Partie 11: Exigences et essais pour
parafoudres connectés aux installations
photovoltaïque

Überspannungsschutzgeräte für
Niederspannung -
Überspannungsschutzgeräte für
besondere Anwendungen einschließlich
Gleichspannung -
Teil 11: Anforderungen und Prüfungen für
Überspannungsschutzgeräte für den
Einsatz in Photovoltaik-Installationen

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This document (EN 50539-11:2013) has been prepared by CLC/TC 37A "Low voltage surge protective devices".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-10-15
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2015-10-15

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1 Scope

This European Standard defines the requirements and tests for SPDs intended to be installed on the d.c. side of photovoltaic installations to protect against induced and direct lightning effects. These devices are connected to d.c. power circuits of photovoltaic generators, rated up to 1 500 V.

It takes into account that photovoltaic generators:

- behave like current generators,
- that their nominal current depends on the light intensity,
- that their short-circuit current is almost equal to the nominal current,
- are connected in series and/or parallel combinations leading to a great variety of voltages, currents and powers from a few hundreds of W (in residential installations) to several MW (photovoltaic fields).

The very specific electrical parameters of PV installations on the d.c. side require specific test requirements for SPDs.

SPDs with separate input and output terminal(s) that contain a specific series impedance between these terminal(s) (so called two port SPDs according to EN 61643-11) are currently not sufficiently covered by the requirements of this standard and require additional consideration.

NOTE In general SPDs for PV applications do not contain a specific series impedance between the input/output terminals due to power efficiency considerations.

SPDs complying with this standard are exclusively dedicated to be installed on the d.c. side of photovoltaic generators. PV installation including batteries and other d.c. applications are not taken into account and additional requirements and tests may be necessary for such applications.

SPDs for which the manufacturers declares short circuit mode overload behaviour, shall require specific measures to ensure that such devices will not endanger the operator during maintenance and replacement due to possible d.c. arcing.

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.

HD 588.1 S1:1991, *High-voltage test techniques — Part 1: General definitions and test requirements (IEC 60060-1:1989 + corrigendum Mar. 1990)*

EN 50521, *Connectors for photovoltaic systems — Safety requirements and tests*

EN 60068-2-78, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state (IEC 60068-2-78)*

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

EN 60664-1:2007, *Insulation coordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests (IEC 60664-1:2007)*

EN 61000-6-1, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1)*

EN 61000-6-3, *Electromagnetic compatibility (EMC) — Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3)*

EN 61180-1, *High-voltage test techniques for low-voltage equipment — Part 1: Definitions, test and procedure requirements (IEC 61180-1)*

EN 61643-11:2012, *Low-voltage surge protective devices — Part 11: Surge protective devices connected to low-voltage power systems — Requirements and tests methods (IEC 61643-11:2011, mod.)*

IEC 60050-151:2001, *International Electrotechnical Vocabulary — Part 151: Electrical and magnetic devices*

3 Terms, definitions and abbreviations

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

3.1 Terms and definitions

3.1.1

Surge Protective Device SPD

device that contains at least one nonlinear component that is intended to limit surge voltages and divert surge currents

Note 1 to entry: An SPD is a complete assembly, having appropriate connecting means.

[SOURCE: EN 61643-11:2012]

3.1.2

one-port SPD

SPD having no intended series impedance

Note 1 to entry: A one port SPD may have separate input and output connections.

[SOURCE: EN 61643-11:2012]

3.1.3

voltage switching type SPD

SPD that has a high impedance when no surge is present, but can have a sudden change in impedance to a low value in response to a voltage surge

Note 1 to entry: Common examples of components used in voltage switching type SPDs are spark gaps, gas tubes and thyristors. These are sometimes called "crowbar type" components.

[SOURCE: EN 61643-11:2012]

3.1.4

voltage limiting type SPD

SPD that has a high impedance when no surge is present, but will reduce it continuously with increased surge current and voltage

Note 1 to entry: Common examples of components used in voltage limiting type SPDs are varistors and avalanche breakdown diodes. These are sometimes called "clamping type" components.

[SOURCE: EN 61643-11:2012]

3.1.5

combination type SPD

SPD that incorporates both, voltage switching components and voltage limiting components.

Note 1 to entry: The SPD may exhibit voltage switching, limiting or both.

[SOURCE: EN 61643-11:2012]

3.1.6

modes of protection

intended current path between terminals, that contains one or more protective components, for which the manufacturer declares a protection level, e.g. + to -, + to earth, - to earth

Note 1 to entry: Additional terminals may be included within this current path.

[SOURCE: EN 61643-11:2012]