

English version

**Low-voltage surge protective devices -
Surge protective devices for specific application including d.c. -
Part 12: Selection and application principles -
SPDs connected to photovoltaic installations**

Parafoudres basse tension -
Parafoudres pour applications spécifiques
incluant le courant continu -
Partie 12: Principes de choix et
d'application -
Parafoudres connectés aux installations
photovoltaïques

Überspannungsschutzgeräte für
Niederspannung -
Überspannungsschutzgeräte für
besondere Anwendungen einschließlich
Gleichspannung -
Teil 12: Auswahl und
Anwendungsgrundsätze -
Überspannungsschutzgeräte für den
Einsatz in Photovoltaik-Installationen

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CENELEC

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Foreword

This document (CLC/TS 50539-12:2013) has been prepared by CLC/TC 37A "Low voltage surge protective devices".

This document supersedes CLC/TS 50539-12:2010.

CLC/TS 50539-12:2013 includes the following significant technical changes with respect to CLC/TS 50539-12:2010:

- a) scope and definitions have been revised to align CLC/TS 50539-12 with EN 50539-11;
- b) structure of the document has been revised for better clarification;
- c) only Type 1 d.c. SPDs can be used for cases described in 6.4;
- d) multi-earthed solar systems have been introduced for SPD selection and for current sharing calculation;
- e) Table 1 (impulse withstand) has been introduced;
- f) current sharing in Annex A has been revised;
- g) Annex B has been created;
- h) risk assessment has been introduced in Annex C.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

1 Scope

This Technical Specification describes the principles for selection, location, coordination and operation of SPDs to be connected to PV installations. The d.c. side is rated up to 1 500 V d.c. and the a.c. side, if any, is rated up to 1 000 V rms 50 Hz.

The electrical installation starts from a PV generator or a set of interconnected PV modules with their cables, provided by the PV generator manufacturer, up to the user installation or the utility supply point.

For PV installations including batteries, additional requirements will be necessary.

NOTE 1 HD 60364-7-712, CLC/TS 61643-12 and EN 62305-4 are also applicable.

NOTE 2 This Technical Specification deals only with SPDs, and not with SPDs components integrated inside equipment.

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.

CLC/TS 61643-12, *Low-voltage surge protective devices – Part 12: Surge protective devices connected to low-voltage power distribution systems – Selection and application principles (IEC 61643-12)*

EN 50539-11, *Low-voltage surge protective devices – Surge protective devices for specific application including d.c. – Part 11: Requirements and tests for SPDs in photovoltaic applications*

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

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

EN 61643-11, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and tests methods (IEC 61643-1)*

EN 61643-21, *Low voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signalling networks – Performance requirements and testing methods (IEC 61643-21)*

EN 62305-2:2012, *Protection against lightning – Part 2: Risk management (IEC 62305-2:2010, mod.)*

EN 62305-4, *Protection against lightning – Part 4: Electrical and electronic systems within structures (IEC 62305-4)*

HD 60364-4-443, *Electrical installations of buildings – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances – Clause 443: Protection against overvoltages of atmospheric origin or due to switching (IEC 60364-4-44)*

HD 60364-5-534, *Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control – Clause 534: Devices for protection against overvoltages (IEC 60364-5-53)*

ITU-T Recommendation K.20, *Resistibility of telecommunication equipment installed in a telecommunications centre to overvoltages and overcurrents*

ITU-T Recommendation K.21, *Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents*

3 Terms and definitions

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

3.1

PV generator

assembly of PV arrays connected to one input of the inverter

3.2

PV-installation

erected equipment of a PV power supply system

3.3

open-circuit maximum voltage

$U_{OC\ MAX}$

maximum voltage across an unloaded (open) PV generator, PV string, PV array or on the d.c. side of the PV inverter

Note 1 to entry: Calculation of $U_{OC\ MAX}$ is performed in Annex B.

3.4

lightning protection system

LPS

complete system used to reduce physical damage due to lightning flashes to a structure

Note 1 to entry: It consists of both external and internal lightning protection systems.

[SOURCE: EN 62305-1:2011, 3.42]

3.5

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, 3.1.1]

3.6

external lightning protection system

part of the LPS consisting of an air-termination system, a down-conductor system and an earth-termination system

[SOURCE: EN 62305-1:2002, 3.43]

3.7

separation distance

s

distance between two conductive parts at which no dangerous sparking can occur

[SOURCE: EN 62305-3:2011, 3.28, modified — abbreviation 's' is added]