TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CLC/TS 50539-12

December 2013

ICS 29.120.50

Supersedes CLC/TS 50539-12:2010

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

This Technical Specification was approved by CENELEC on 2013-10-21.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. CLC/TS 50539-12:2013 E

Contents

Page

Figures

Tables

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]