



**BSI Standards Publication**

## **Low-voltage surge protective devices**

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Part 32: Surge protective devices connected to the DC side of photovoltaic installations — Selection and application principles

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## National foreword

This Published Document is the UK implementation of CLC/TS 51643-32:2020. It supersedes PD CLC/TS 50539-12:2013, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/37/1, Surge Arresters - Low Voltage.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

## Low-voltage surge protective devices - Part 32: Surge protective devices connected to the DC side of photovoltaic installations - Selection and application principles

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## European foreword

This document (CLC/TS 51643-32:2020) has been prepared by CLC/TC 37A "Low-voltage surge protective devices".

This document supersedes CLC/TS 50539-12:2013 and all of its amendments and corrigenda (if any).

CLC/TS 51643-32:2020 includes the following significant technical changes with respect to CLC/TS 50539-12:2013:

- slight restructuring without impact on the content (such as changing the title of a clause by changing the text of one clause to another),
- deletion of the current branch concept of an SPD,
- referring to EN 61634-11:2019 instead of EN 50539-11:2013,
- referring to OCFM, SCFM instead of acronyms and concepts SCM and OCM,
- deletion of Annex C relating to the simplified risk assessment A,
- addition of a new annex dealing with telecommunication circuits.

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

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## **Introduction**

This document provides useful information for the selection of SPDs connected to photovoltaic installations.

This document does not address the fundamentals of SPDs that are addressed in CLC/TS 61643-12 which are necessary for its correct understanding and application.

This document provides information to evaluate, with reference to the documents listed in Clause 2, the additional needs for surge protective devices (SPDs) to be installed on the DC side and on the AC side of a photovoltaic (PV) system, to protect against induced and direct lightning effects. It gives guidance for selection, operation and installation of SPDs, including the selection of SPD type, surge current values and cross sections of bonding conductors.

The specific electrical parameters of a PV array or a PV source require specific SPDs on the DC side.

This document considers SPDs used in different locations and in different kinds of PV systems. It gives examples and provides a simplified and common approach to determine impulse discharge current values for the DC side of different PV installations.



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## 1 Scope

This document describes the principles for selection, installation and coordination of SPDs intended for use in Photovoltaic (PV) systems up to 1500 V DC and for the AC side of the PV system rated up to 1000 V RMS 50/60 Hz.

The photovoltaic installation extends from a PV array or a set of interconnected PV-modules to include the associated cabling and protective devices and the converter up to the connection point in the distribution board or the utility supply point.

This document considers SPDs used in different locations and in different kinds of PV systems:

- PV systems located on the top of a building;
- PV systems located on the ground like free field power plants characterized by multiple earthing and a meshed earthing system.

The term PV installation is used to refer to both kinds of PV systems. The term PV power plant is only used for extended free-field multi-earthed power systems located on the ground.

For PV installations including batteries additional requirements could be necessary.

NOTE 1 The HD 60364 series, EN 62305 series and CLC/TS 61643-12 also apply.

NOTE 2 This document deals only with SPDs and not with surge protective components integrated inside equipment (e.g. inverters, (PCE) power conversion equipment).

## 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.

HD 60364-5-534:2016, *Low-voltage electrical installations - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control - Clause 534: Devices for protection against transient overvoltages (IEC 60364-5-53:2001/A2:2015, modified)*

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)*

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 61643-31:2019, *Low-voltage surge protective devices - Part 31: Requirements and test methods for SPDs for photovoltaic installations (IEC 61643-31:2018)*

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

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