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Low-voltage surge protective devices – Part 11: Surge protective devices connected to AC low-voltage power systems – Requirements and test methods

Parafoudres basse tension – Partie 11: Parafoudres connectés aux réseaux basse tension en courant alternatif – Exigences et méthodes d'essai

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FOREWORD

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IEC 61643-11 has been prepared by subcommittee 37A: Low-voltage surge protective devices, of IEC technical committee 37: Surge arresters. It is an International Standard.

This second edition cancels and replaces the first edition published in 2011. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Specific requirements for SPDs for AC applications are now contained in this document, whereas the common requirements for all SPDs are now contained in IEC 61643-01;
b) Clarification on test application either to a complete SPD, to a "mode of protection", or to a complete "SPD assembly";

c) Additional measurement of voltage protection level on "combined modes of protection" between live conductors and PE;

d) Additional duty test for T1 and T2 SPDs with follow current to check variation of the follow current value at lower impulse currents;

e) Modified and amended short circuit current test requirements to better cover up to date internal SPD disconnector technologies;

f) Improved dielectric test requirements for the SPD's main circuits and added dielectric test requirements for "electrically separated circuits";

g) Additional clearance requirements for "electrically separated circuits".

The requirements of this document supplement, modify or replace certain of the general requirements contained in IEC 61643-01 and shall be read and applied together with the latest edition of IEC 61643-01, as indicated by the undated normative reference in Clause 2 of this document.

Numbering of clauses follows the numbering of IEC 61643-01, but, dependent on the application of clauses from IEC 61643-01, does not necessarily follow sequentially.

If a clause in IEC 61643-01 is not explicitly called up or referred to in this document, then this clause does not apply to SPDs covered by this document. Any instructions in this document calling up clauses from IEC 61643-01 are written in Italic type.

NOTE In other words, if e.g. Clause 4 is called up in this document all subclauses of Clause 4 of IEC 61643-01 are applied without modification. But, if e.g. some modifications are required on subclauses of Clause 9 of IEC 61643-01, then the relevant second level subclauses of IEC 61643-01 (e.g. 9.1, 9.3 etc.) are called up separately and it is indicated how they are applied.

The numbering of additional subclauses to IEC 61643-01 in this document starts with the number 100 in the last section of the subclause added (see e.g. 4.100). The numbering of additional tables and figures to IEC 61643-01 in this document starts with the number 100.

The text of this International Standard is based on the following documents:

Draft	Report on voting
37A/427/FDIS	37A/431/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61643 series, published under the general title *Low-voltage surge protective devices*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This document recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of SPDs when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice.

This document takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the SPD is connected to the supply mains. However, national wiring rules might differ.

If the intended applications of an SPD are covered by different parts of the IEC 61643-X1 series, all relevant parts are applied, as far as is reasonable.

This document addresses safety and performance tests for surge protective devices (SPDs) for AC applications in conjunction with IEC 61643-01.

This document addresses T1 SPD, T2 SPD and T3 SPD according to IEC 61643-01.

IEC 61643-12 addresses the selection and application principles of SPDs.

LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 11: Surge protective devices connected to AC low-voltage power systems – Requirements and test methods

1 Scope

This document, together with IEC 61643-01, is applicable to devices for surge protection against indirect and direct effects of lightning or other transient overvoltages.

These devices are intended to be connected to AC power circuits and equipment rated up to 1 000 V RMS, the preferred frequencies taken into account in this document are 50/60 Hz. Other frequencies are not excluded. Performance and safety requirements, tests and ratings are specified in this document. These devices contain at least one nonlinear component and are intended to limit surge voltages and divert surge currents.

The test requirements provided by this document are based on the assumption that the SPD is connected to an AC power circuit fed by a power source providing a linear voltage-current characteristic. When the SPD is to be connected to a different kind of source or to a different frequency, careful consideration is required. This mainly applies with regard to system and fault conditions to be expected in such a system (e.g. expected short circuit current, TOV-stresses).

This document can apply for railway applications, where related product standards do not exist for that area or for certain applications.

Based on a risk assessment it might not be necessary to apply all requirements of this document to SPDs designed for specific power applications only, e.g. circuits with a low power capability, circuits supplied by nonlinear sources, circuits with protective separation from the utility supply.

NOTE 1 More information on risk assessment is provided in IEC Guide 116.

NOTE 2 Other exclusions based on national regulations are possible.

2 Normative references

For the purposes of this document the normative references given in IEC 61643-01 with the following additions apply.

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.

IEC 60364-4-44:2024, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60947-1:2020, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 61643-01, *Low-voltage surge protective devices – Part 01: General requirements and test methods*