SLOVENSKI STANDARD
oSIST prEN IEC 61643-41:2024

01-januar-2024

Nizkonapetostne naprave za zaščito pred prenapetostnimi udari - 41. del: Naprave za zaščito pred prenapetostnimi udari za nizkonapetostne DC napajalne sisteme - Zahteve in preskusne metode

Low-voltage surge protective devices - Part 41: Surge protective devices connected to DC low-voltage power systems - Requirements and test methods

Ta slovenski standard je istoveten z: **prEN IEC 61643-41:2023**

ICS:

29.120.50	Varovalke in druga nadtokovna zaščita	Fuses and other overcurrent protection devices
29.240.10	Transformatorske postaje. Prenapetostni odvodniki	Substations. Surge arresters

oSIST prEN IEC 61643-41:2024 **en**

37A/402/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
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IEC SC 37A : LOW-VOLTAGE SURGE PROTECTIVE DEVICES	
SECRETARIAT: United States of America	SECRETARY: Mr Casey Granata
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 37B,TC 64,TC 81,TC 82,TC 109	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

Low-voltage surge protective devices - Part 41: Surge protective devices connected to DC low-voltage power systems – Requirements and test methods

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

This document must be read in conjuction with 37A/401/CDV for IEC 61643-01.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 41: Surge protective devices connected to DC low-voltage power systems – Requirements and test methods

FOREWORD

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International Standard IEC 61643-41 has been prepared by subcommittee 37A: Low-voltage surge protective devices, of IEC technical committee 37:Surge arresters.

This first edition only contains the specific requirements for SPDs for DC applications.

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

119 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

123 • reconfirmed,
124 • withdrawn,
125 • replaced by a revised edition, or
126 • amended.

127 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations
128 may need a transitional period following publication of a new, amended or revised IEC publication in which to make
129 products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

130 It is the recommendation of the committee that the content of this publication be adopted for national
131 implementation not earlier than 12 months and not later than 36 months from the date of publication.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

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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 standard 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 standard 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 may differ.

If the intended applications of an SPD are covered by different parts of the IEC 61643-X1 (X = 1,2,3,4, etc.) series, all relevant parts shall be applied, as far as is reasonable.

NOTE 1: Throughout this publication, when “part 01” is mentioned, it refers to IEC 61643-01, and when “part 11” is mentioned, it refers to this standard.

This part of the IEC 61643 series addresses safety and performance tests for surge protective devices (SPDs) for DC applications in conjunction with part 01.

This part 11 addresses T1 SPD, T2 SPD and T3 SPD according to part 01.

The requirements of this part 41 supplement, modify or replace certain of the general requirements contained in part 01 and shall be read and applied together with the latest edition of part 01, as indicated by the undated normative reference in the normative references of this document.

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

If a clause in part 01 is not explicitly called up or referred to in this part 41, then this clause does not apply to SPDs covered by this part 41. Any instructions in this standard calling up clauses from part 01 are written in Italic type.

NOTE 2: In other words, if e.g. clause 4 is called up in this document all subclauses of clause 4 of part 01 are applied without modification. But, if e.g. some modifications are required on subclauses of clause 9 of part 01, then the relevant second level subclauses of part 01 (e.g. 9.3, 9.5 etc.) are called up separately and it is indicated how they are applied.

The numbering of additional subclauses to part 01 in this document starts with the number 100 in the last section of the subclause added (see e.g. 4.100)

IEC 61643-12 addresses the general selection and application principles of SPDs, but focusing on SPDs for AC low-voltage power systems. A separate standard IEC 61643-42 is planned, which should then specifically address selection and application principles for SPDs for DC low-voltage power systems

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

LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 41: Surge protective devices connected to DC low-voltage power systems – Requirements and test methods

1 Scope

This part of the IEC 61643 series 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 DC power circuits and equipment rated up to 1 500 V DC Performance and safety requirements, tests and ratings are specified in this standard. 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 standard are based on the assumption that the SPD is connected to a DC 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, 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 standard can apply for railway applications, when related product standards do not exist for that area or for certain applications.

Based on a risk assessment it may not be necessary to apply all requirements of this standard 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.

SPDs for PV applications are not covered by this standard.

NOTE 2: Such SPDs for PV applications are covered by IEC 61643-31.

NOTE 3: Other exclusions based on national regulations are possible.

2 Normative references

For the purposes of this document the normative references given in part 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 61643-01, *Low-voltage surge protective devices – Part 01: General requirements and test methods*

3 Terms, definitions and abbreviated terms

Clause 3 from part 01 applies.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Classification

Clause 4 from part 01 applies with the following additions:

4.13 End of life mode of the SPD-assembly

Clause 4.13 from part 01 applies with the following additions:

For SPDs for DC power circuits fed by a power source providing a linear voltage-current characteristic, only the open circuit mode according 4.12.1 of IEC 61643-01 is applicable.

NOTE: A short circuiting SPD, when used with its required SPD disconnectors (SPD-assembly), fulfils the conditions to be classified open circuit mode (OCM).

5 Void

6 Marking and other product information

Clause 6 from part 01 applies with the following additions.

6.2 List of items

Clause 6.2 from part 01 applies with the following additions:

The following information from the list of items in clause 6.2 of part 01 and any additional items specified shall be provided as required below.

6.2.100 Markings which are required on the body, or permanently attached to the body, of the SPD:

6.2.100.1 Markings which shall be visible after installation:

Items a1) to a3) from 6.2 of part 01 shall be visible after installation.

For portable SPDs and for pluggable SPDs it is sufficient that above markings are visible in the unplugged condition. This does not apply to the minimum marking requirements according 6.1 of part 01.

6.2.100.2 Markings which are not required to be visible after installation:

Items a4) to a8) from 6.2 of part 01 shall be visible on the SPD, but are not required to be visible after installation.

6.2.101 Information to be provided by the manufacturer:

Items a1) to a40) from 6.2 of part 01 shall be provided, if applicable, and in addition:

Clause 6.2, a20) from part 01 applies with the following addition:

This includes information e.g. on the separation of the DC system from any upstream AC or DC system and their interconnection as related to system earthing.

For item a25) from 6.2 of part 01 the AC and DC values or a curve shall be provided according 9.3.3.1.

6.2.102 Information which shall be provided by the manufacturer for type testing, as applicable:

Items a41) to a43) from 6.2 of part 01 shall be provided.

7 Service conditions

Clause 7 from part 01 applies with the following addition:

8 Requirements

Clause 8 from part 01 applies with the following additions and exemptions:

8.3 Electrical requirements

Clause 8.3 from part 01 applies with the following additions:

8.3.9 Behaviour under temporary overvoltages

Clause 8.3.9 from part 01 applies with the following additions:

SPD shall either withstand the overvoltages caused by faults or disturbances in the high or low voltage system, or fail in a manner not creating a hazard.

8.3.9.100 General requirements for TOV tests

Compliance is checked by the test in accordance with 9.3.9.100 and the following clauses, depending on the kind of TOV.

For this test, Annex C is to be considered.

8.3.9.101 TOVs caused by DC low voltage system faults (earth faults and short circuits)

Compliance is checked by the test in accordance with 9.3.9.100 and 9.3.9.101.

8.3.9.102 TOVs caused by DC low voltage system faults (loss of mid-point connection)

Compliance is checked by the test in accordance with 9.3.9.100 and 9.3.9.102.

8.3.9.103 TOVs caused by faults in the high (medium) voltage AC system transferred to a DC system, which is derived from a low-voltage AC TT- or IT-system without separation

Compliance is checked by the test in accordance with 9.3.9.100 and 9.3.9.103 and according to 6.2, a20) and a30) of part 01 as amended by 6.2.101.

This requirement does not apply to SPDs which shall only be used in a DC system with separation from the AC system or when the AC system is a TN system.

8.3.9.104 TOVs caused by faults in the high (medium) voltage DC system transferred to a DC TT- or IT-system with common earthing

Compliance is checked by the test in accordance with 9.3.9.100 and 9.3.9.104.and according to 6.2, a20) and a30) of part 01 as amended by 6.2.101.

This requirement does not apply to SPDs which shall only be used in a DC system without common HVDC earthing.

9 Tests

Clause 9 from part 01 applies with the following additions:

9.1 General

Clause 9.1 from part 01 applies with the following additions:

9.1.1 General testing procedures

Clause 9.1.1 from part 01 applies with the following additions:

The test voltage U_{test} shall be selected from Annex B based on the information given by the manufacturer according to 6.2.101 and according to 6.2, a10, a11), a20) and a21) of part 01.

The test frequency shall be 50Hz or 60 Hz ±3 Hz unless otherwise specified.

For SPDs with a designated mid-point connection, which may be applied in systems without distributed mid-point according to the manufacturer’s instructions, separate testing is required for the L+ or L– or both L+ and L– to PE modes of protection with the mid-point being unconnected.