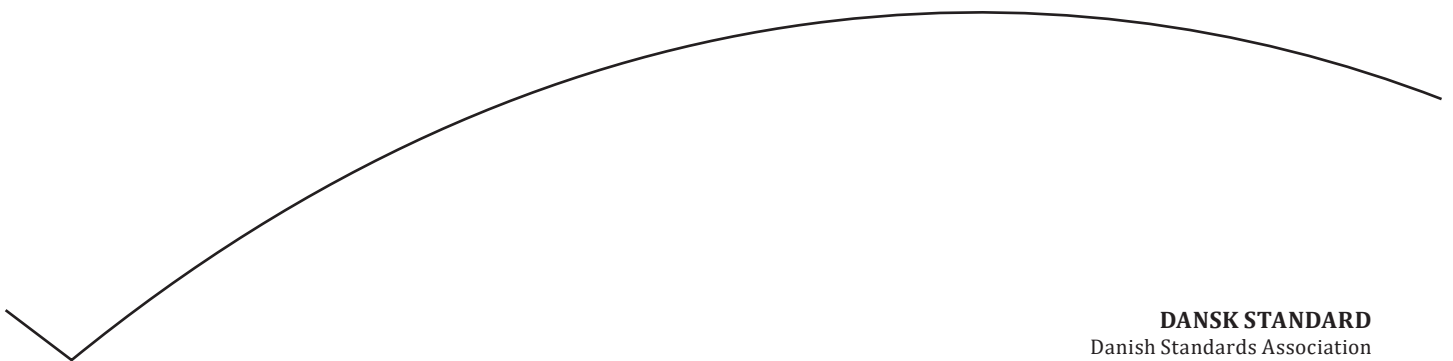


Jording af stærkstrømsinstallationer med spændinger over 1 kV a.c.

Earthing of power installations exceeding 1 kV a.c.



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EUROPÄISCHE NORM

September 2024

ICS 29.120.50

English Version

Earthing of power installations exceeding 1 kV a.c.

Prises de terre des installations électriques
de puissance en courant alternatif
de tension supérieure à 1 kV

Erdung von Starkstromanlagen mit
Nennwechselfspannungen über 1 kV

This amendment A1 modifies the European Standard EN 50522:2022; it was approved by CENELEC on 2 July 2024. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR ELECTROTECHNICAL STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION ELECTROTECHNIQUE
EUROPÄISCHES KOMITEE FÜR ELEKTROTECHNISCHE NORMUNG

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Contents

Page

European foreword	3
1 Modification to Clause 2, “Normative references”	4
2 Modifications to Clause 3, “Terms and definitions”	4
3 Modification to 4.1, “General requirements”	5
4 Modifications to 4.2, “Electrical requirements”	5
5 Modifications to 4.3, “Safety criteria”	5
6 Modification to 4.4, “Functional requirements”	5
7 Modifications to 5.4, “Dimensioning with regard to touch voltages”	6
8 Modification to 6.1.1, “High and low voltage earthing systems”	6
9 Modification to 6.1.2, “LV supply only within HV substations”	6
10 Modification to 6.1.3, “LV supply leaving or coming to HV substations”	6
11 Modification to 6.1.4, “LV in the proximity of HV substation”	6
12 Modification to 7.1, “Installation of earth electrodes and earthing conductors”	6
13 Modification to 7.2, “Lightning and transients”	6
14 Modification to Clause 8, “Measurements”	7
15 Modification to 9.1, “Inspections”	7
16 Modification to 9.2, “Measurements”	7
17 Modification to A.1, “Method of calculating permissible touch voltages UTp”	7

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European foreword

This document ([EN 50522:2022/A1:2024](#)) has been prepared by CLC/TC 99X “Power installations exceeding 1 kV a.c. (1,5 kV d.c.)”.

The following dates are fixed:

- latest date by which this document has to be (dop) 2025-07-02 implemented at national level by publication of an identical national standard or by endorsement
- latest date by which the national standards (dow) 2027-07-02 conflicting with this document have to be withdrawn

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.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

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Earthing of power installations exceeding 1 kV a.c.

1 Modification to Clause 2, “Normative references”

Replace the reference to IEC 61936-1:2010 with the following:

[IEC 61936-1:2021](#), Power installations exceeding 1 kV AC and 1,5 kV DC - Part 1: AC

2 Modifications to Clause 3, “Terms and definitions”

In 3.2:

delete “effective touch voltage”,

add “<effective>” in the definition

replace the first source with the following:

“[SOURCE: [IEC 60050-195:2021](#), 195-05-11, modified – The symbol U_T has been added. In the definition, “by a human being or livestock” has been deleted. In Note 1 to entry, “of the human being or livestock” has been replaced by “of the person”.]”

replace the second source with the following:

“[SOURCE: [IEC 61936-1:2021](#), 3.7.12, modified – Note 2 added]”

In 3.3, add the following source:

“[SOURCE: [IEC 61936-1:2021](#), 3.7.13, modified – Note 1 added]”

In 3.4:

replace the first source with the following:

“[SOURCE: [IEC 60050-195:2021](#), 195-05-09, modified]”

replace the second source with the following:

“[SOURCE: [IEC 61936-1:2021](#), 3.7.14, modified – Note 1 added]”

In 3.5, add the following source:

“[SOURCE: [IEC 61936-1:2021](#), 3.7.15]”

In 3.6, in the source, replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

In 3.7, in the source, replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

In 3.11:

delete “(earth fault location)”

delete the Note 1 to entry

replace “Note 2 to entry” with “Note 1 to entry”

add “in systems with” at the end of “For single earth faults, this is”, and delete “in systems with” at the beginning of each list item

replace “Note 3 to entry” with “Note 2 to entry”

add the following note to entry:

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“Note 3 to entry: See Figures 2 to 7.”

replace the source with the following:

“[SOURCE: [IEC 61936-1:2021](#), 3.7.25, modified – in Note 2 reference to [EN 60909 series](#) added, Note 3 with reference to Figures added]”.

3 Modification to 4.1, “General requirements”

Replace the last sentence with the following sentence:

“The requirements of [IEC 61936-1:2021](#), 4.1.1 first and third paragraph only apply.”

4 Modifications to 4.2, “Electrical requirements”

In 4.2.1, replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

In 4.2.2:

replace the first sentence with the following:

“The requirements of [IEC 61936-1:2021](#), 4.2.4 paragraph 1 and 2 and Note 1 apply.”

add after the first sentence:

“Faults within and outside the installation site shall be examined to determine the worst fault location.

Simultaneous faults in different voltage systems are not considered.

The requirements of [IEC 61936-1:2021](#), 4.2.4 paragraph 3, 4, 5, 6 and Note 2 apply.”

add after the last sentence:

“The requirements of [IEC 61936-1:2021](#), 4.2.4 paragraph 7 and 8 apply.”

5 Modifications to 4.3, “Safety criteria”

replace the first sentence with the following:

“The requirements of [IEC 61936-1:2021](#), 10.2.1 paragraph 1, 2 and 3 apply.”

replace the third sentence with the following:

“The requirements of [IEC 61936-1:2021](#), 10.2.1 NOTE apply.”

replace the fifth sentence with the following:

“The requirements of [IEC 61936-1:2021](#), 10.2.1 paragraph 6 apply.”

add after the last paragraph in 4.3:

“[SOURCE: IEC 61936-1:2021, 10.2.1, modified – intolerable touch voltage is replaced by touch voltages exceeding permissible limit values]”

6 Modification to 4.4, “Functional requirements”

Replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)” (twice).

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7 Modifications to 5.4, “Dimensioning with regard to touch voltages”

In 5.4.1, replace in the source of Figure 8 “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

In 5.4.3:

replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)” (five times).

delete “The requirements of [IEC 61936-1:2010](#), 10.3.1 paragraph 1 the step m) apply.”.

8 Modification to 6.1.1, “High and low voltage earthing systems”

Replace “[IEC 61936-1:2010](#), 10.2.3” with “[IEC 61936-1:2021](#), 10.2.3.1”.

9 Modification to 6.1.2, “LV supply only within HV substations”

Replace “[IEC 61936-1:2010](#), 10.2.3.1” with “[IEC 61936-1:2021](#), 10.2.3.2”.

10 Modification to 6.1.3, “LV supply leaving or coming to HV substations”

Delete “The requirements of [IEC 61936-1:2010](#), 10.2.3.2 paragraph 1, 1st sentence apply.”.

Add the following paragraph:

“Full compliance is ensured if the earthing system of the electrical power installation is part of a global earthing system or connected to a multi-earthed HV neutral conductor in a balanced system.”

Add the following source after the first paragraph:

“[SOURCE: [IEC 61936-1:2021](#), 10.2.3.3, modified – reference to Table 2]”.

Replace “[IEC 61936-1:2010](#), 10.2.3.2” with “[IEC 61936-1:2021](#), 10.2.3.3”.

11 Modification to 6.1.4, “LV in the proximity of HV substation”

Replace “[IEC 61936-1:2010](#), 10.2.3.3” with “[IEC 61936-1:2021](#), 10.2.3.4”.

In Table 2, replace the content of table footnote d with the following:

“The typical value for F is 2, indicating the touch voltage is 50 % of U_E . Higher values of F (up to 5) may be applied where there are additional connections of the PEN conductor to earth which therefore may reduce the touch voltage as a percentage of U_E . For certain soil structures, caution is necessary in soils with high contrast of top layer resistivity and underlying lower resistivity. In this case F is closer to 1 as the touch voltage can exceed 50 % of the U_E . If the PEN or neutral conductor of the low-voltage system is connected to earth only at the HV earthing system, the value of F shall be 1.”

Replace the source with the following:

“[SOURCE: [IEC 61936-1:2021](#), Table 6, modified reference to Figure 8]”

12 Modification to 7.1, “Installation of earth electrodes and earthing conductors”

Replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

13 Modification to 7.2, “Lightning and transients”

Replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

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14 Modification to Clause 8, “Measurements”

Replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

15 Modification to 9.1, “Inspections”

Replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

16 Modification to 9.2, “Measurements”

Replace “[IEC 61936-1:2010](#)” with “[IEC 61936-1:2021](#)”.

17 Modification to A.1, “Method of calculating permissible touch voltages U_{Tp} ”

Replace “e.g.” with “e.g.,”.

In the source, replace “[IEC 61936-1:2020](#)” with “[IEC 61936-1:2021](#)”.

Replace “Factors”: with “where”:

Delete “[SOURCE: [IEC 61936-1:2010](#), Annex B, Factors modified]”.

Replace “Touch voltage U_T ”: with “ U_T Touch voltage”:

Replace “Permissible touch voltage U_{Tp} ” with “ U_{Tp} Permissible touch voltage”.

Replace “Fault duration t_f ” with “ t_f Fault duration”.

Replace “Body current limit $I_B(t_f)$ ” with “ $I_B(t_f)$ Body current limit”.

Align text in the third column:

“c2 in IEC 60479-1:2018, Figure 20 and Table 11,

where probability of ventricular fibrillation is less than 5 %.

I_B depends on fault duration”

Replace “Heart current factor HF” with “HF Heart current factor”.

Replace “i.e.” with “i.e.,”.

Replace “Body impedance $Z_T(U_T)$ ” with “ $Z_T(U_T)$ Body impedance”.

Replace “Body factor BF” with “BF Body factor”.

Replace “i.e.” with “i.e.,”.

Add the following source:

“[SOURCE: [IEC 61936-1:2021](#), Annex B, modified, “bare skin to bare skin” added to touch voltage]”.

Replace “conditions” with “situations”.