# SLOVENSKI STANDARD

# SIST EN 60909-3:2004

junij 2004

Short-circuit currents in three-phase a.c systems - Part 3: Currents during two separate simultaneous line-to-earth short-circuits and partial short-circuit currents flowing through earth



ICS 17.220.01

Referenčna številka
SIST EN 60909-3:2004(en)

EUROPEAN STANDARD **EN 60909-3**

NORME EUROPÉENNE

EUROPÄISCHE NORM November 2003

ICS 17.220.01; 29.240.20

English version

# Short-circuit currents in three-phase a.c systems Part 3: Currents during two separate simultaneous line-to-earth short-circuits and partial short-circuit currents flowing through earth

(IEC 60909-3:2003)

Courants de court-circuit dans les réseaux triphasés à courant alternatif
Partie 3: Courants durant deux court-circuits monophasés simultanés séparés à la terre et courants de court-circuit partiels s'écoulant à travers la terre
(CEI 60909-3:2003)

Kurzschlussströme in Drehstromnetzen
Teil 3: Ströme bei Doppelerdkurzschluss und Teilkurzschlussströme über Erde
(IEC 60909-3:2003)



This European Standard was approved by CENELEC on 2003-11-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard 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 Central Secretariat or to any CENELEC member.

This European Standard 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 Central Secretariat has the same status as the official versions.

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

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Ref. No. EN 60909-3:2003 E

## Foreword

The text of document 73/127/FDIS, future edition 2 of IEC 60909-3, prepared by IEC TC 73, Short-circuit currents, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60909-3 on 2003-11-01.

The following dates were fixed:

| | | |
|---|---|---|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2004-08-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2006-11-01 |

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative annexes A and B are informative.
Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60909-3:2003 was approved by CENELEC as a European Standard without any modification.

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## Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60909-0 | 2001 | Short-circuit currents in three-phase a.c. systems<br>Part 0: Calculation of currents | EN 60909-0 | 2001 |

# NORME INTERNATIONALE

# INTERNATIONAL STANDARD

**CEI**
**IEC**
**60909-3**

Deuxième édition
Second edition
2003-09

# Courants de court-circuit dans les réseaux triphasés à courant alternatif –

# Partie 3: Courants durant deux courts-circuits monophasés simultanés séparés à la terre et courants de court-circuit partiels s'écoulant à travers la terre



# Short-circuit currents in three-phase a.c. systems –



# Part 3: Currents during two separate simultaneous line-to-earth short circuits and partial short-circuit currents flowing through earth



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# CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# SHORT-CIRCUIT CURRENTS IN THREE-PHASE AC SYSTEMS –

## Part 3: Currents during two separate simultaneous line-to-earth short circuits and partial short-circuit currents flowing through earth

## FOREWORD

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International Standard IEC 60909-3 has been prepared by IEC technical committee 73: Short-circuit currents.

This second edition cancels and replaces the first edition published in 1995. This edition constitutes a technical revision.

The text of this standard is based on the following documents:

| FDIS | Voting report |
|---|---|
| 73/127/FDIS | 73/128/RVD |

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

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

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

# SHORT-CIRCUIT CURRENTS IN THREE-PHASE AC SYSTEMS –

## Part 3: Currents during two separate simultaneous line-to-earth short circuits and partial short-circuit currents flowing through earth

## 1 Scope

This part of IEC 60909 specifies procedures for calculation of the prospective short-circuit currents with an unbalanced short circuit in high-voltage three-phase AC systems operating at nominal frequency 50 Hz or 60 Hz, i.e.

a) currents during two separate simultaneous line-to-earth short circuits in isolated neutral or resonant earthed neutral systems;

b) partial short-circuit currents flowing through earth in case of single line-to-earth short circuit in solidly earthed or low-impedance earthed neutral systems.

The currents calculated by these procedures are used when determining induced voltages or touch or step voltages and rise of earth potential at a station (power station or substation).

This standard does not cover:



a) short-circuit currents deliberately created under controlled conditions as in short-circuit testing stations, or

b) short-circuit currents in the electrical installations on board ships or aeroplanes, or

c) single line-to-earth faults in isolated or resonant earthed systems.



The object of this standard is to establish practical and concise procedures for the calculation of line-to-earth short-circuit currents during two separate simultaneous line-to-earth short circuits and partial short-circuit currents through earth from electrical installations, leading to conservative results with sufficient accuracy. For this purpose, the current is determined by considering an equivalent voltage source applied at the short-circuit location with all other sources set to zero. The procedure is suitable for determination by manual methods or digital computation.

This standard is an addition to IEC 60909-0. General definitions, symbols and calculation assumptions refer to that publication. Special items only are defined or specified in this document. This does not exclude the use of special methods, for example the superposition method, adjusted to particular circumstances, if they give at least the same precision.

As stated in IEC 60909-0, short-circuit currents and their parameters may also be determined by system tests.

The calculation of the short-circuit parameters based on the rated data of the electrical equipment and the topological arrangement of the system has the advantage of being possible both for existing systems and for systems at the planning stage.