INTERNATIONAL STANDARD

IEC 60865-1

Second edition
1993-09

Short-circuit currents – Calculation of effects –

Part 1: Definitions and calculation methods

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

Reference number
IEC 60865-1:1993(E)

INTERNATIONAL STANDARD

IEC 60865-1

Second edition
1993-09

Short-circuit currents – Calculation of effects –

Part 1: Definitions and calculation methods

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE XA

For price, see current catalogue

Publication 865-1 de la CEI
(Deuxi me dition 1993)

Courants de court-circuit -
Calcul des effets

Partie 1: D finitions et m thodes de calcul

IEC Publication 865-1
(Second edition 1993)

Short-circuit currents -
Calculation of effects

Part 1: Definitions and calculation methods

CORRIGENDUM 1

Page 64, tableau 2

Dans la troisi me colonne, pour un court-circuit biphas , *au lieu de:*

1,8

lire:

- *(un tiret)*

Page 65, table 2

In the third column, for a line-to-line *short circuit, instead of:*

1,8

read:

- *(dash)*

Page 74, figure 2

Sur la gauche des dessins, ajouter:

a)
et b) *respectivement.*

Page 75, figure 2

Add, at the left-hand side of the drawings:

a)
and b) *respectively.*

Page 104, annexe A, article A.2

Remplacer la derni re ligne de l' quation existante par la nouvelle ligne suivante:

Page 105, annex A, clause A.2

Replace the last line of the existing equation by the following new line:

$$2\left(\arctan\frac{(a/d)+1}{b/d} - 2\arctan\frac{a/d}{b/d} + \arctan\frac{(a/d)-1}{b/d}\right)\Bigg\}\frac{a/d \cdot b/d}{6}$$

CONTENTS

Clause Page

Section 3: The thermal effect on bare conductors and electrical equipment

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SHORT-CIRCUIT CURRENTS – CALCULATION OF EFFECTS –

Part 1: Definitions and calculation methods

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

International Standard IEC 865-1 has been prepared by IEC technical committee 73: Short-circuit currents.

This second edition cancels and replaces the first edition published in 1986 and constitutes a technical revision.

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

DIS	Report on Voting
73(CO)16	73(CO)18

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

Annex A forms an integral part of this standard.

Annex B is for information only.

IEC 865 consists of the following parts, under the general title: Short-circuit currents – Calculation of effects:

- Part 1: 1993: Definitions and calculation methods;
- Part 2: 1994: Examples of calculation (in preparation).

SHORT-CIRCUIT CURRENTS – CALCULATION OF EFFECTS –

Part 1: Definitions and calculation methods

Section 1: General

1.1 Scope and object

This International Standard is applicable to the mechanical and thermal effects of short-circuit currents. It contains standardized procedures for the calculation of the effects of the short-circuit currents in two sections as follows:

- Section 2 - The electromagnetic effect on rigid conductors and flexible conductors.
- Section 3 - The thermal effect on bare conductors and electrical equipment.

For cables and insulated conductors reference is made, for example, to IEC 949 and IEC 986.

Only a.c. systems for rated voltages up to and including 420 kV are dealt with in this standard.

The following points should particularly be noted:

1) The calculation of short-circuit currents should be based on IEC 909.

2) Short-circuit duration used in this standard depends on the protection concept and should be considered in that sense.

3) These standardized procedures are adjusted to practical requirements and contain simplifications with safety margins. Testing or more detailed methods of calculation or both may be used.

4) In section 2 of this standard, for arrangements with rigid conductors, only the stresses caused by short-circuit currents are calculated. Furthermore, other stresses can exist, e.g. caused by dead-load, wind, ice, operating forces, earthquake. The combination of these loads with the short-circuit loading should be part of an agreement and/or be given by standards, e.g. erection-codes.

The tensile forces in arrangements with flexible conductors include the effects of dead-load. With respect to the combination of other loads the considerations given above are valid.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 909: 1988, *Short-circuit current calculation in three-phase a.c. systems.*

IEC 949: 1988, *Calculation of thermally permissible short-circuit currents, taking into account non-adiabatic heating effects*

IEC 986: 1989, *Guide to the short-circuit temperature limits of electric cables with a rated voltage from 1,8/3 (3,6) kV to 18/30 (36) kV*