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# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

# 中华人民共和国国家标准

GB/T 15544.1-2013/IEC 60909-0: 2001

Replace GB/T 15544-1995

# Short-circuit current calculation in three-phase a.c. systems—Part 1: Calculation of currents

三相交流系统短路电流计算 第1部分: 电流计算

(IEC 60909-0: 2001 SHORT-CIRCUIT CURRENTS IN THREE-PHASE AC SYSTEMS -Part 0: Calculation of currents)

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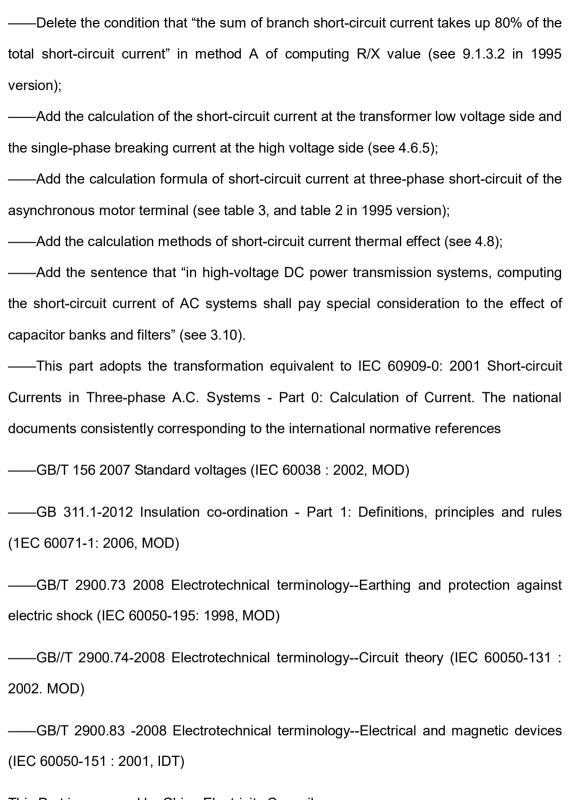
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## Foreword

GB/T 15544 Short-circuit current calculation in three-phase a.c. systems is divided into 5

Parts.
——Part 1: Calculation of currents
——Part 2: Factors for the calculation of short-circuit currents
——Part 3: Electrical equipment data
——Part 4: Currents during two separate simultaneous line-to-earth short-circuits and
partial short-circuit currents flowing through earth.
——Part 5: Numerical example
This Part is Part 1 of GB GB/T 15544.
This Part is drafted according to the rules provided in GB/T 1.1-2009.
This part replaces GB/T 15544-1995 Short-circuit Current Calculation in Three-phase A.C.
Systems. Compared with GB/T 15544-1995, this part has the following technical changes
in addition to the editorial:
——Delete the limit of "nominal voltage 380V~220kV" in the scope of application (see 1.1,
and 1.2 in 1995 version);
——Delete the "asymmetrical breaking current" in the terms and definitions (see 3.9.2. in
1995 version);
——Add the "thermal equivalent short-circuit current" in the terms and definitions (see
1.3.23);
——Change the recommended values of voltage coefficients (see table 1, and Table 1 in
1995 version);
——Change the calculation methods of the impedance correction factor of
generator-transformer sets (see 3.7, and 10.3.2.7 and 10.3.2.8 in 1995 version);
——Add the impedance correction factor of network transformers (see 3.3.3);
——Change the calculation methods of resistive component in generator impedance (see
3.6.1. and 10.3.2.6 in 1995 version):



This Part is proposed by China Electricity Council.

This Part is under the jurisdiction of National Technical Committee for Standardization of short circuit current calculation (SAC/TC 424)

Drafting organizations of this Part: National Electric Power Dispatching and

Communication Center, China Electric Power Research Institute and Xi'an Jiaotong University.

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### Introduction

For easy use of IEC 60909 standard and for ease of standard supplement and revision, the National Technical Committee on Short-circuit Current Calculation of Standardization Administration of China (SAC/TC 424) decides through research to revise GB/T 15544 to be series standards: the revised GB/T 15544.1 is identical to IEC 60909-0; GB/T 15544.2 to IEC 60909-1; GB/T 1554.3 to IEC 60909-2; GB/T 15544.4 to IEC 60909-3; and GB/T 15544.5 to IEC 60909-4.

# Short-circuit current calculation in three-phase a.c. systems—Part 1: Calculation of currents

#### 1 General

### 1.1 Scope

This part of GB/T 15544 is applicable to the calculation of short-circuit currents:

- in low-voltage three-phase a.c. systems
- in high-voltage three-phase a.c. systems

operating at a nominal frequency of 50 Hz or 60 Hz.

Systems at highest voltages of 550 kV and above with long transmission lines need special consideration.

This part establishes a general, practicable and concise procedure leading to results, which are generally of acceptable accuracy. For this calculation method, an equivalent voltage source at the short-circuit location is introduced. 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. The superposition method gives the short-circuit current related to the one load flow presupposed. This method, therefore, does not necessarily lead to the maximum short-circuit current.

This part deals with the calculation of short-circuit currents in the case of balanced or unbalanced short circuits.

In case of an accidental or intentional conductive path between one line conductor and local earth, the following two cases must be clearly distinguished with regard to their different physical properties and effects (resulting in different requirements for their calculation):

• line-to-earth short circuit, occurring in a solidly earthed neutral system or an impedance earthed neutral system;



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