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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 3859.2-1993

Semiconductor convertors—Application guide

半导体变流器　应用导则

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Semiconductor Converters Application Guide

Replace GB 3859-83

The standard is equivalent to apply the IEC 146-1-2(1991) *Semiconductor Converters-General Requirements and Line Commutated Converters Part 2: Application Guide*

1 Subject Content and Application Scope

1.1 Subject content

The standard specifies guidances on application materials of converter, including further description on calculation methods and relevant performances.

1.2 Application scope

The standard primarily involves line commutated converters as the basis of described content and calculation methods. But certain chapters (for instance materials of virtual junction temperature calculation and safe operation etc.,) are also applicable to other converters.

The standard is the extension and supplement of GB/T 3589.1. It describes technical conditions, performances and variations of converters as well as relevant background information and calculation methods for the convenience of converter and GB/T 3859.1.

2 Normative references

GB/T 3859.1 Semiconductor Converters--Specification of Basic Requirements

GB/T 3859.3 Semiconductor Converters--Transformers and Reactors

GB 10236 Guides for Evaluation of Interference Effects and Compatibility Technology between Semiconductor Converters and Power Supply System

GB/T 2900.33 Electrotechnical Terminology Power Electronics Technology

GB 4208 Classification of Degrees on Protection Provided by Enclosures

3 Terms and Definitions

For the purpose of this document, terms and definitions are given. Other terms of converter and power electronics technology can refer to GB/T 3859.1 and GB/T 2900.33. Some terms may have wider implications in certain circumstances but what represent here is just specific definitions in this standard.

3.1 Definitions related to converter faults

3.1.1 Conduction through

In converter operation, the situation that an arm of thyristor connection continues conduction at the end of normal conduction period and thyristor continues to conduct direct current during off-state period.（see Figure 1a)

3.1.2 Conduction failure

Failure to achieve conduction in an arm of converter connection during the normal conduction interval or to fire at an incorrect moment (see Figure 1c)

Note: Slight degree of asymmetry generated by minor variation of converter delay angle can not be considered as conduction failure.

3.1.3 Break through

During normal off-state period, the situation that an arm of converter loses its ability to block forward and thus on-state current may travel through in that period. (See Figure 1b)

Note: Breakthrough can occur in rectifier operation as well as inverter operation and for various reasons, for example excessive junction temperature, voltage surges in excess of rated peak off-state voltage, excessive rate of rise of off-state voltage or spurious gate current.

3.1.4 Break down

Failure that permanently deprives semiconductor device of its property to forward or backward block voltage (forward breakdown or backward breakdown),

3.1.5 False firing

Firing of a valve device or an arm at an incorrect instant

3.1.6 Commutation failure

Failure to commutate the current from a conduction arm connected to thyristor to the succeeding arm.

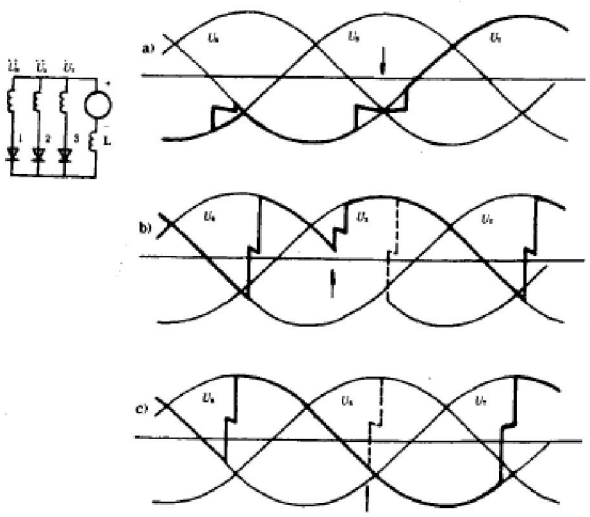

Figure 1 Voltage of Converter on the condition of Faulty
a) Arm 3 conduction through, b) Arm 2 break through, c) Arm 2 conduction failure

3.2 Relevant definitions related to the phenomenon about converter generated transients

3.2.l d.c. Side transients

Voltage transients produced by rapid changes of the d.c. voltage applied to the components such as inductor and capacitor of the d.c. Circuit

3.2.2 Commutation transient on line (repetitive transient)

Voltage transients produced on the a.c. line after commutation.

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