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**General rules of reliability for low voltage apparatus
(English Translation)**

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Foreword

This guidance technical document was drafted in accordance with the rules given in GB/T 1.1-2009.

The guidance technical document was proposed by the China Electrical Appliances Industry Association.

The guidance technical documents shall be under the jurisdiction of the National Low Voltage Standardization Technical Committee (SAC/TC 189).

The responsible drafting organizations of this guidance technical document. Shanghai Institute of Electrical Science (Group) Co., Ltd., Shanghai Electric Research Institute, Hebei University of Technology.

The participating drafting organizations of this standard. Zhejiang Zhengtai Electric Co., Ltd., Shanghai Liangxin Electric Co., Ltd., Beijing ABB Low-voltage Electrical Co., Ltd., China Electrical and Mechanical Co., Ltd., Shanghai Electric Technology Co., Ltd., Shanghai Electrical Equipment Testing Institute.

1 Scope

This guidance technical document specifies the general requirements for the reliability verification of the household and similar purpose residual current

operated circuit breakers, household and similar purposes over-current protection circuit breakers, plastic enclosure circuit breakers, overload relays, small capacity contactors, and contactor relays.

This guidance technical document applies to the reliability verification tests for the household and similar purpose residual current operated circuit breakers, household and similar purposes over-current protection circuit breakers, plastic enclosure circuit breakers, overload relays, small capacity contactors, and contactor relays.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this Standard.

GB/T 2900.13-2008 Electrotechnical terminology - Dependability and quality of service

GB/T 2900.18-2008 Electrotechnical terminology - Low voltage apparatus

GB/T 5080 (All parts) Reliability testing

GB 10963.1-2005 Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installation - Part 1. Circuit-breakers for AC operation

GB 10963.2-2008 Circuit-breakers for overcurrent protection for household and similar installation - Part 2. Circuit-breakers for AC and DC operation

GB/T 14048.1-2012 Low-voltage switchgear and controlgear - Part 1. General rules

GB14048.2-2008 Low-voltage switchgear and controlgear - Part 2. Circuit breakers

GB 14048.4-2010 Low-voltage switchgear and controlgear - Part 4-1.

Contactors and motor starters - Electromechanical contactors and motor

starters (including motor protector)

GB 14048.5-2008 Low-voltage switchgear and controlgear - Part 5-1. Control circuit device and switching element - Electromechanical control circuit devices

GB 14048.6-2008 Low-voltage switchgear and controlgear - Part 4-2.

Contactors and motor starters - Semiconductor controllers and starters for AC motors (including soft starters)

GB 16916.1-2014 Residual current operated circuit-breakers without overcurrent protection for household and similar uses (RCCB) - Part 1.

General rules

GB 16917.1-2014 Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1.

General rules

3.1 Terms and definitions

The terms and definitions as defined in GB/T 2900.13-2008, GB/T 2900.18-2008, GB/T 5080 (all parts), GB 10963.1-2005, GB 10963.2-2008, GB 14048.1-2012, GB 14048.2-2008, GB 14048.4 -2010, GB 14048.5-2008, GB 14048.6-2008, GB 16916.1-2014, GB 16917.1-2014 and the following apply to this document.

3.1.1

Reliability

It refers to the ability of the product to complete the specified function within the specified conditions and within the specified time.

3.1.2

Failure rate

It refers to the probability of failure of the product within the unit time after working to the time t .

3.1.3

success ratio, the residual current protection success ratio after the environmental test, the short circuit protection success ratio, and the overload protection success ratio as the reliability characteristic quantity.

4.1.2 Reliability leveling of the residual current operated circuit breakers

for household and similar purposes

It respectively uses the operation failure rate level, the residual current protection success ratio, the success ratio of the residual current protection after the environmental test, the short circuit protection success ratio, and the overload protection success ratio as the reliability indicators.

Based on the value of the maximum failure rate $\lambda_{\max}$, the operation failure rate level is divided into four levels (level 4, sub-level 4, level 3, and sub-level 3).

Based on the value of the unacceptable success ratio R_1 , the residual current protection success ratio is divided into four levels (level 6, level 5, level 4, and level 3), the success ratio of residual current protection after the environmental test is divided into four levels (level 6, level 5, level 4, and level 3), the short circuit protection success ratio is divided into four levels (level 6, level 5, level 4, and level 3), AND the overload protection success ratio is divided into four levels (level 5, level 4, level 3, and level 2).

4.2 Reliability indicators for overcurrent protection circuit breakers for

household and similar purposes

4.2.1 Reliability characteristic quantity of overcurrent protection circuit

breakers for household and similar purposes

The overcurrent protection circuit breaker for household and similar purposes uses the operation failure rate (λ), the short-circuit protection success ratio, and the overload protection success ratio as its reliability characteristic quantity.