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High-voltage switchgear and controlgear – Part 313: Direct current circuit-breakers

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 313: Direct current circuit-breakers

FOREWORD

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IEC TS 62271-313 has been prepared by subcommittee 17A: Switching devices, of IEC technical committee 17: High-voltage switchgear and controlgear. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
17A/1413/DTS	17A/1416/RVDTS

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

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This document is to be read in conjunction with IEC TS 62271-5:2024, to which it refers and which is applicable unless otherwise specified in this document. In order to simplify the indication of corresponding requirements, the same numbering of clauses and subclauses is used as in IEC TS 62271-5 if applicable. Modifications to these clauses and subclauses are given under the same references whilst additional subclauses are numbered from 101.

A list of all parts in the IEC 62271 series, published under the general title *High-voltage switchgear and controlgear,* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

This document mainly refers to IEC TS 62271-5. In addition, some findings and considerations from CIGRE are referred to in this document [1],[2] [1].

[1] Numbers in square brackets refer to the Bibliography.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 313: Direct current circuit-breakers

1 Scope

This part of IEC 62271 is applicable to direct current circuit-breakers (hereafter termed DC circuit-breakers) for indoor or outdoor installation having direct voltages of 100 kV and above for operation on DC transmission and distribution systems.

This document includes the (mechanical) switching devices, including the residual current interruption devices, and their operating devices, power electronic switches, primary auxiliary circuits and energy dissipation systems, as well as their controls. Depending on design and system needs, operation can be for one current direction only (unidirectional) or for both directions (bidirectional).

This document does not cover:

Series reactors described in IEC TS 63014-1 for reducing the rate-of-rise of fault current. Although these are often installed with the operation of DC circuit-breakers, they are typically and specifically system-dependent.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-441, *International Electrotechnical Vocabulary (IEV) – Part 441: Switchgear, controlgear and fuses*

IEC 60059, *IEC standard current ratings*

IEC 60099-9:2014, *Surge arresters – Part 9: Metal-oxide surge arresters without gaps for HVDC converter stations*

IEC 60700-1, *Thyristor valves for high voltage direct current (HVDC) power transmission – Part 1: Electrical testing*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60825-2, *Safety of laser products –Part 2: Safety of optical fibre communication systems (OFCSs)*

IEC 61071:2017, *Capacitors for power electronics*

IEC 61850-10, *Communication networks and systems for power utility automation – Part 10: Conformance testing*

IEC TS 62271-5:2024, *High-voltage switchgear and controlgear – Part 5: Common specifications for direct current switchgear*

IEC 62271-100:2021, *High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers*

IEC TR 62271-300, *High-voltage switchgear and controlgear – Part 300: Seismic qualification of alternating current circuit-breakers*

IEC 62501, *Voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) power transmission – Electrical testing*

IEC 62751-1, *Power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems – Part 1: General requirements*

IEC 62751-2, *Power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems – Part 2: Modular multilevel converters*

IEC TR 63259:2022, *Water cooling systems for power electronics used in electrical transmission and distribution systems*