SVENSK STANDARD

SS-EN IEC 62501, utg 2:2025

2025-02-05

COMMENTED VERSION

Spänningsstyva strömriktare (VSC) för elöverföring med högspänd likström (HVDC) – Elektrisk provning

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

En så kallad ”Commented Version” (CMV) innehåller både den fastställda IEC-standarden och en kommenterad och ändringsmarkerad standard. Alla tillägg och borttagningar sedan den tidigare utgåvan är markerade med färg. Med en CMV sparar du mycket tid när du ska identifiera och förklara aktuella ändringar i standarden. SEK Svensk Elstandard kan bara ge ut CMV i de fall den finns tillgänglig från IEC.

IEC 62501

Edition 2.0 2024-04
COMMENTED VERSION

INTERNATIONAL STANDARD

colour inside

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.200, 29.240.99

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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VOLTAGE SOURCED CONVERTER (VSC) VALVES FOR HIGH-VOLTAGE DIRECT CURRENT (HVDC) POWER TRANSMISSION – ELECTRICAL TESTING

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
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This commented version (CMV) of the official standard IEC 62501:2024 edition 2.0 allows the user to identify the changes made to the previous IEC 62501:2009+AMD1:2014 +AMD2:2017 CSV edition 1.2. Furthermore, comments from IEC SC 22F experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 62501 has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment. It is an International Standard.

This second edition cancels and replaces the first edition published in 2009, Amendment 1:2014 and Amendment 2:2017. This edition constitutes a technical revision.

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c) AC-DC voltage test between valve terminals, Clause 9, is restructured and alternative tests, by individual AC and DC voltage tests, added in 9.4.2;
d) Partial discharge test in routine test program is removed;
e) More information on valve component fault tolerance, Annex B, is added;
f) Valve losses determination is added as Annex C.

The text of this International Standard is based on the following documents:

Draft	Report on voting
22F/731/CDV	22F/748A/RVC

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 International Standard 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.

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VOLTAGE SOURCED CONVERTER (VSC) VALVES FOR HIGH-VOLTAGE DIRECT CURRENT (HVDC) POWER TRANSMISSION – ELECTRICAL TESTING

1 Scope

This International Standard applies to self-commutated converter valves, for use in a three-phase bridge voltage sourced converter (VSC) for high voltage DC power transmission or as part of a back-to-back link, and to dynamic braking valves. It is restricted to electrical type and production tests.

~~The scope of this standard includes the electrical type and production tests of dynamic braking valves which may be used in some HVDC schemes for d.c. overvoltage limitation.~~

This document can be used as a guide for testing of high-voltage VSC valves used in energy storage systems (ESS). 1

The tests specified in this document are based on air insulated valves. ~~For other types of valves, The test requirements and acceptance criteria should be agreed between the purchaser and the supplier.~~ The test requirements and acceptance criteria can be used for guidance to specify the electrical type and production tests of other types of valves.

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 60060 (all parts), *High-voltage test techniques*

IEC 60071 (all parts), *Insulation co-ordination*

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

IEC 60700-1:2015, *Thyristor valves for high voltage direct current (HVDC) power transmission – Part 1: Electrical testing*
IEC 60700-1:2015/AMD1:2021

IEC 62747, *Terminology for voltage-sourced converters (VSC) for high-voltage direct current (HVDC) systems*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

SVENSK STANDARD

SS-EN IEC 62501, utg 2:2025

Fastställd	Sida	Ansvarig kommitté
2025-02-05	1 (57)	SEK TK 22F

Spänningsstyva strömriktare (VSC) för elöverföring med högspänd likström (HVDC) – Elektrisk provning

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

Som svensk standard gäller europastandarden EN IEC 62501:2024. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 62501:2024.

Nationellt förord

Europastandarden EN IEC 62501:2024

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 62501, Second edition, 2024 - Voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) power transmission – Electrical testing**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 62501, utg 1:2010 med eventuella tillägg, ändringar och rättelser gäller ej fr o m 2027-05-15.

ICS 29.200.00; 29.240.99

Denna standard är fastställd av SEK Svensk Elstandard,
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Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: elstandard.se

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62501

May 2024

ICS 29.200; 29.240.99

Supersedes EN 62501:2009;
EN 62501:2009/A1:2014;
EN 62501:2009/A2:2017

English Version

Voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) power transmission - Electrical testing (IEC 62501:2024)

Valves à convertisseur de source de tension (VSC) pour le transport d'énergie en courant continu à haute tension (CCHT) - Essais électriques
(IEC 62501:2024)

Ventile von Spannungszwischenkreis-Stromrichtern (VSC) für die Hochspannungsgleichstromübertragung (HGÜ) - Elektrische Prüfung
(IEC 62501:2024)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN IEC 62501:2024 E

SEK Svensk Elstandard

SS-EN IEC 62501, utg 2:2025

European foreword

The text of document 22F/731/CDV, future edition 2 of IEC 62501, prepared by SC 22F "Power electronics for electrical transmission and distribution systems" of IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62501:2024.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2025-02-15
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2027-05-15

This document supersedes EN 62501:2009 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of the International Standard IEC 62501:2024 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60146-2 NOTE Approved as EN 60146-2

IEC 62751-1 NOTE Approved as EN 62751-1

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60060	series	High-voltage test techniques	EN 60060	series
IEC 60071	series	Insulation co-ordination	EN IEC 60071	series
IEC 60270	-	High-voltage test techniques - Partial discharge measurements	EN 60270	-
IEC 60700-1	2015	Thyristor valves for high voltage direct current (HVDC) power transmission - Part 1: Electrical testing	EN 60700-1	2015
+ AMD1	2021		+ A1	2021
IEC 62747	-	Terminology for voltage-sourced converters (VSC) for high-voltage direct current (HVDC) systems	EN 62747	-
ISO/IEC 17025	-	General requirements for the competence of testing and calibration laboratories	EN ISO/IEC 17025	-

IEC 62501

Edition 2.0 2024-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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