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High voltage direct current (HVDC) grid systems and connected converter stations - Guideline and parameter lists for functional specifications - Part 2: Parameter lists

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 11/25

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(IEC/TS 63291-2:2023)

Réseaux en courant continu à haute tension (CCHT) et  
postes de conversion connectés - Lignes directrices et  
listes de paramètres pour les spécifications fonctionnelles -  
Partie 2: Listes de paramètres  
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Hochspannungsgleichstrom-Netzsysteme und  
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Parameter-Listen für funktionale Spezifikationen - Teil 2:  
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In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60633:2019	NOTE	Approved as EN IEC 60633:2019 (not modified)
IEC 61660-1:1997	NOTE	Approved as EN 61660-1:1997 (not modified)
IEC 61000-4-7	NOTE	Approved as EN 61000-4-7
IEC 61975:2010	NOTE	Approved as EN 61975:2010 (not modified)
IEC 61975:2010/A1:2016	NOTE	Approved as EN 61975:2010/A1:2017 (not modified)
IEC 60909 (series)	NOTE	Approved as EN 60909 (series)
IEC 62271-100	NOTE	Approved as EN IEC 62271-100
IEC 62271-102	NOTE	Approved as EN IEC 62271-102

## 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.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62747	2014	Terminology for voltage-sourced converters (VSC) for high-voltage direct current (HVDC) systems	EN 62747	2014
+ A1	2019		+ A1	2019
IEC/TS 63291-1	2023	High voltage direct current (HVDC) grid systems and connected converter stations - Guideline and parameter lists for functional specifications - Part 1: Guideline	CLC IEC/TS 63291-1	2025



# IEC TS 63291-2

Edition 1.0 2023-09

# TECHNICAL SPECIFICATION

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**High voltage direct current (HVDC) grid systems and connected converter stations – Guideline and parameter lists for functional specifications – Part 2: Parameter lists**





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IEC TS 63291-2

Edition 1.0 2023-09

# TECHNICAL SPECIFICATION

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**High voltage direct current (HVDC) grid systems and connected converter stations – Guideline and parameter lists for functional specifications – Part 2: Parameter lists**

INTERNATIONAL  
ELECTROTECHNICAL  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HIGH VOLTAGE DIRECT CURRENT (HVDC) GRID SYSTEMS AND  
CONNECTED CONVERTER STATIONS – GUIDELINE AND PARAMETER  
LISTS FOR FUNCTIONAL SPECIFICATIONS –**

**Part 2: Parameter lists**

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IEC TS 63291-2 has been prepared by IEC technical committee TC 115: High Voltage Direct Current (HVDC) transmission for DC voltages above 100 kV. It is a Technical Specification.

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

Draft	Report on voting
115/320/DTS	115/329/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 Technical Specification is to be used in conjunction with IEC TS 63291-1:2023.

A list of all parts in the IEC 63291 series, published under the general title *High voltage direct current (HVDC) grid systems and connected converter stations – Guideline and parameter lists for functional specifications*, can be found on the IEC website.

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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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## INTRODUCTION

In the preparation of this document, special care has been taken to as far as possible describe the requirements in a technologically independent way. In order to achieve that, a function of interest is described by a comprehensive set of parameters. The parameters are selected based on a systematic analysis of physical phenomena relevant to achieve the requested functionality.

Reflecting the early stage of technology, the technical parameters need comprehensive explanations and background information. This need is reflected in the dual character of the content, which is presented in the two corresponding parts:

- IEC TS 63291-1, Guideline containing the explanations and the background information in context with the parameter lists;
- IEC TS 63291-2, Parameter lists containing the essential lists of parameters and values describing properties of the AC as well as the DC system (operating conditions) and parameters describing the performance of the newly installed component (performance requirements).

IEC TS 63291-1 and IEC TS 63291-2 have the same structure to aid the reader.

At the time of writing there is no real-life multi-national, multi-vendor HVDC grid project to which the guideline and parameter lists can be applied. Practical experiences in the near future are expected to provide input for developing these guideline and parameter lists further.

# HIGH VOLTAGE DIRECT CURRENT (HVDC) GRID SYSTEMS AND CONNECTED CONVERTER STATIONS – GUIDELINE AND PARAMETER LISTS FOR FUNCTIONAL SPECIFICATIONS –

## Part 2: Parameter lists

### 1 Scope

This document defines aspects on planning, specification, and execution of multi-vendor HVDC grid systems also referred to as HVDC grids. The terms "HVDC grid systems" or "HVDC grids" are used in this document to describe HVDC systems for power transmission having more than two HVDC stations connected to a common DC circuit. The DC circuit can be of radial or meshed topology or a combination thereof. In this document, the term "HVDC grids" is used.

While this document focuses on requirements specific for HVDC grids, some requirements are considered applicable to all HVDC systems in general, i.e., including point-to-point HVDC systems. Existing IEC (e.g., IEC TR 63363-1 [1]), Cigre or other relevant documents have been used for reference as far as possible.

Corresponding to electric power transmission applications, this document is applicable to high voltage systems, i.e., those having typically nominal DC voltages higher than 50 kV with respect to earth are considered in this document.

NOTE While the physical principles of DC networks are basically voltage independent, the technical options for designing equipment get much wider with lower DC voltage levels, e.g. in the case of converters or switchgear.

This document covers technical aspects of:

- coordination of HVDC grid and AC systems,
- HVDC grid characteristics,
- HVDC grid control,
- HVDC grid protection,
- AC/DC converter stations,
- HVDC grid installations, including DC switching stations and HVDC transmission lines,
- studies and associated models,
- testing.

Beyond the scope of this document, the following content is proposed for future work:

- DC/DC converter stations.

### 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 62747:2014, *Terminology for voltage-sourced converters (VSC) for high-voltage direct current (HVDC) systems*  
IEC 62747:2014/AMD1:2019

IEC TS 63291-2:2023 © IEC 2023

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IEC TS 63291-1:2023, *High voltage direct current (HVDC) grid systems and connected converter stations – Guideline and parameter lists for functional specifications – Part 1: Guideline*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**