

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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**High-voltage direct current (HVDC) transmission – Vocabulary**

**Transport d'énergie en courant continu à haute tension (CCHT) – Vocabulaire**





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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HIGH-VOLTAGE DIRECT CURRENT  
(HVDC) TRANSMISSION – VOCABULARY**

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International Standard IEC 60633 has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment.

This third edition cancels and replaces the second edition published in 1998, Amendment 1:2009 and Amendment 2:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) 40 terms and definitions have been amended and 31 new terms and definitions have been added mainly on converter units and valves, converter operating conditions, HVDC systems and substations and HVDC substation equipment;
- b) a new Figure 13 on capacitor commutated converter configurations has been added.

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

CDV	Report on voting
22F/480/CDV	22F/491A/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of February 2020 have been included in this copy.

## HIGH-VOLTAGE DIRECT CURRENT (HVDC) TRANSMISSION – VOCABULARY

### 1 Scope

This document defines terms for high-voltage direct current (HVDC) power transmission systems and for HVDC substations using electronic power converters for the conversion from AC to DC or vice versa.

This document is applicable to HVDC substations with line commutated converters, most commonly based on three-phase bridge (double way) connections (see Figure 2) in which unidirectional electronic valves, for example semiconductor valves, are used. For thyristor valves, only the most important definitions are included in this document. A more comprehensive list of HVDC valve terminology is given in IEC 60700-2.

### 2 Normative references

There are no normative references in this document.

### 3 Symbols and abbreviated terms

The list covers only the most frequently used symbols. For a more complete list of the symbols which have been adopted for static converters, see IEC 60027 (all parts) and other standards listed in the Bibliography.

#### 3.1 Letter symbols

$U_d$	direct voltage (any defined value)
$U_{d0}$	nominal no-load direct voltage
$U_{di0}$	ideal no-load direct voltage
$U_{dN}$	rated direct voltage
$U_L$	phase-to-phase voltage on line side of converter transformer, RMS value including harmonics
$U_{LN}$	rated value of $U_L$
$U_{v0}$	no-load phase-to-phase voltage on the valve side of transformer, RMS value including harmonics
$I_d$	direct current (any defined value)
$I_{dN}$	rated direct current
$I_L$	current on line side of converter transformer, RMS value including harmonics
$I_{LN}$	rated value of $I_L$
$I_v$	current on valve side of transformer, RMS value including harmonics
$\alpha$	(trigger) delay angle
$\beta$	(trigger) advance angle
$\gamma$	extinction angle
$\mu$	overlap angle
$p$	pulse number
$q$	commutation number