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Standards

Irish Standard  
I.S. EN IEC 60633:2019&AC:2020-04

# High-voltage direct current (HVDC) transmission - Vocabulary

**I.S. EN IEC 60633:2019&AC:2020-04**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

EN IEC 60633:2019/AC:2020-04

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## National Foreword

I.S. EN IEC 60633:2019&AC:2020-04 is the adopted Irish version of the European Document EN IEC 60633:2019, High-voltage direct current (HVDC) transmission - Vocabulary

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN IEC 60633:2019/AC:2020-04**

April 2020

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ICS 29.200

English Version

**High-voltage direct current (HVDC) transmission - Vocabulary  
(IEC 60633:2019/COR1:2020)**

Transport d'énergie en courant continu à haute tension  
(CCHT) - Vocabulaire  
(IEC 60633:2019/COR1:2020)

Hochspannungsgleichstrom-Übertragung (HGÜ) - Begriffe  
(IEC 60633:2019/COR1:2020)

This corrigendum becomes effective on 10 April 2020 for incorporation in the English language version of the EN.



European Committee for Electrotechnical Standardization  
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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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IEC 60633:2019/COR1:2020  
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INTERNATIONAL ELECTROTECHNICAL COMMISSION  
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**IEC 60633**  
Edition 3.0 2019-04

**IEC 60633**  
Édition 3.0 2019-04

HIGH-VOLTAGE DIRECT CURRENT  
(HVDC) TRANSMISSION –

TRANSPORT D'ÉNERGIE EN COURANT CONTINU À  
HAUTE TENSION (CCHT) –

Vocabulary

Vocabulaire

**C O R R I G E N D U M 1**

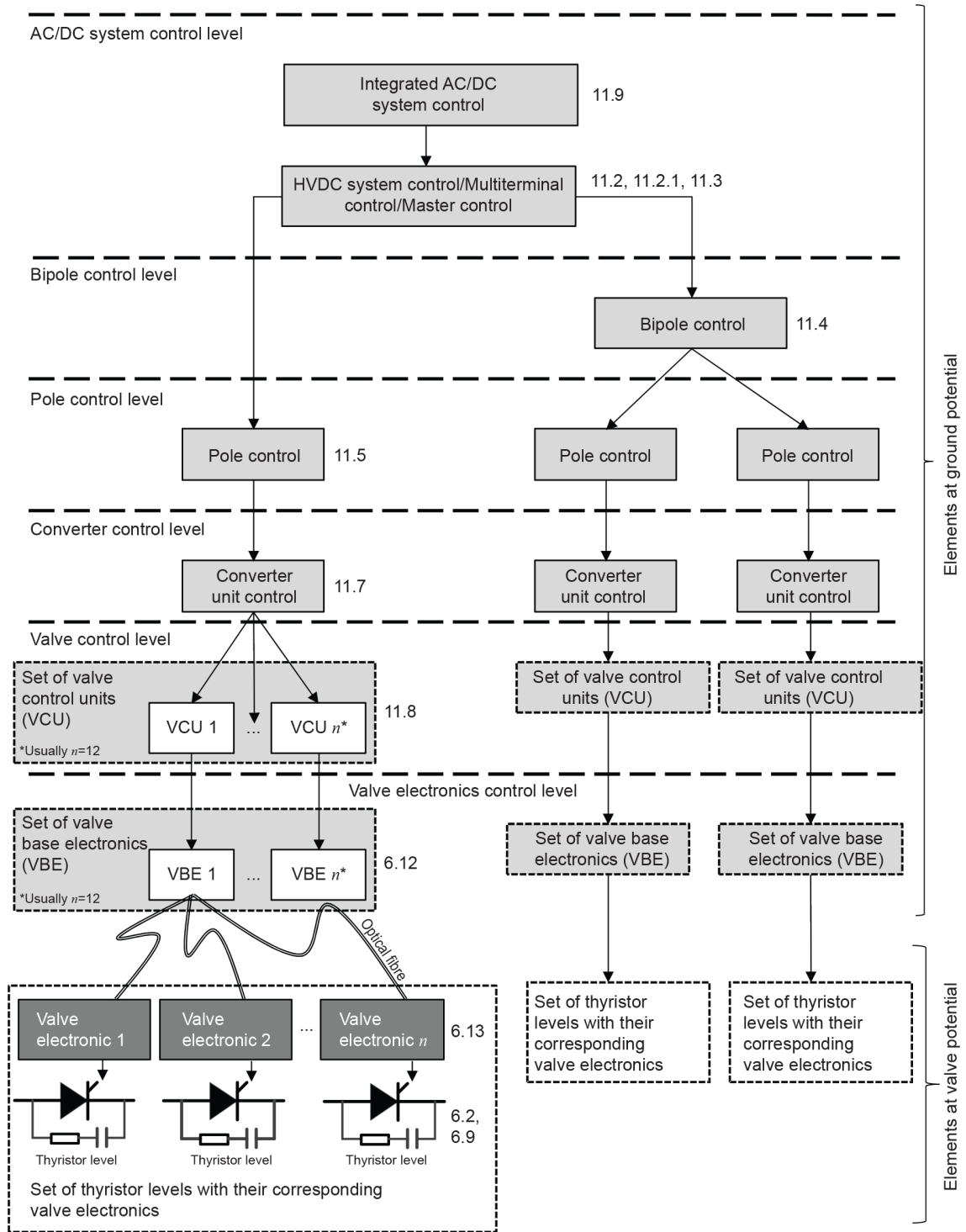
Corrections to the French version appear after the English text.

Les corrections à la version française sont données après le texte anglais.

**Figure 12 – Hierarchical structure of an HVDC control system**

*Replace the existing Figure 12 by the following new figure:*

**Hierarchical structure of an HVDC control system**



IEC

**Key**

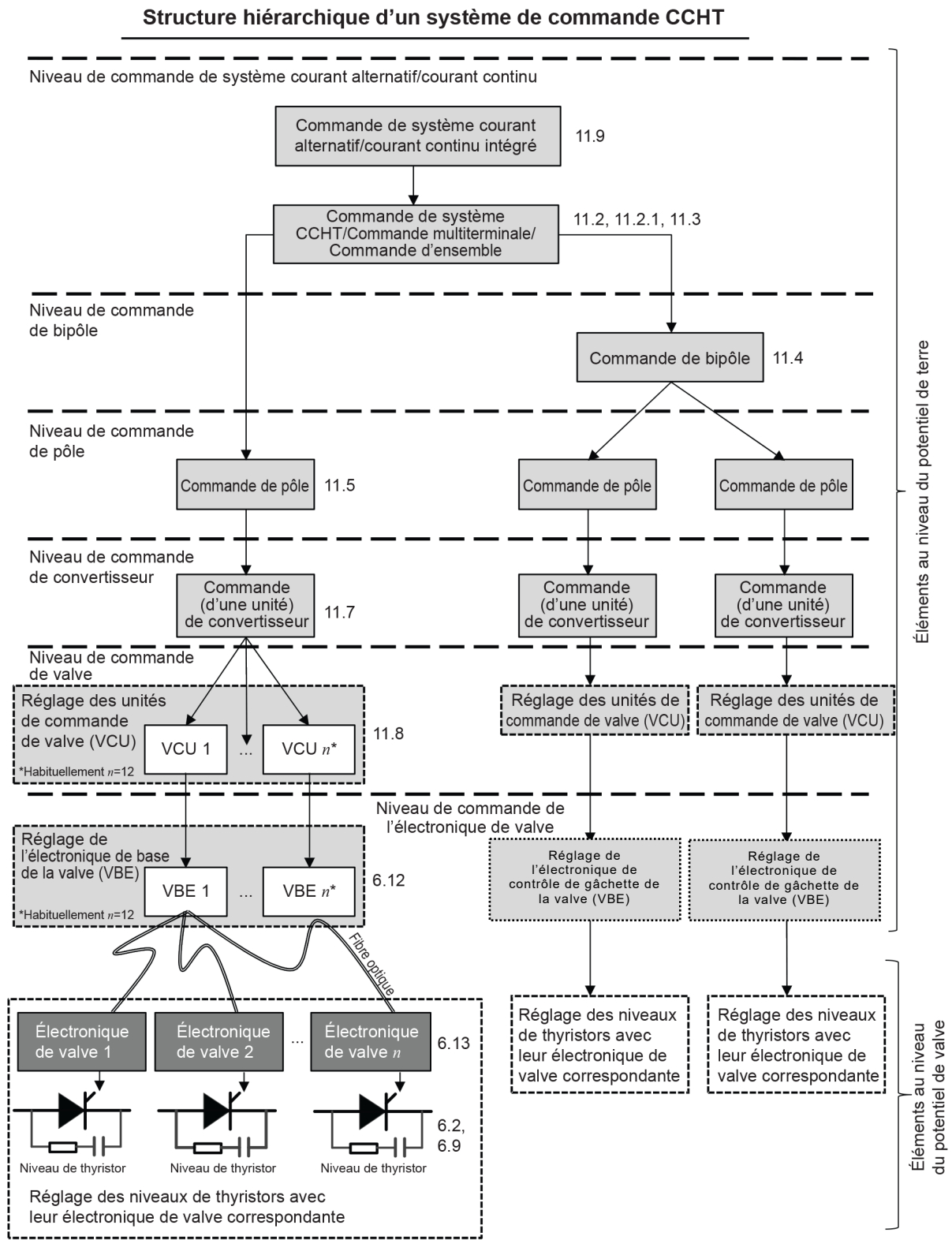
- |                              |                                      |
|------------------------------|--------------------------------------|
| 6.2 Converter bridge         | 11.3 HVDC master control             |
| 6.9 Valve thyristor levels   | 11.4 HVDC system bipole control      |
| 6.12 Valve base electronics  | 11.5 HVDC system pole control        |
| 6.13 Valve electronics       | 11.7 Converter unit control          |
| 11.2 HVDC system control     | 11.8 Valve control unit              |
| 11.2.1 Multiterminal control | 11.9 Integrated AC/DC system control |

**Figure 12 – Hierarchical structure of an HVDC control system**



**Figure 12 – Structure hiérarchique d'un système de commande CCHT**

Remplacer la Figure 12 existante par la nouvelle figure suivante:



**Légende**

- 6.2 Pont de conversion
- 6.9 Niveau de thyristor de valve
- 6.12 Électronique de contrôle de gâchette de la valve
- 6.13 Électronique de valve

- 11.3 Commande d'ensemble CCHT
- 11.4 Commande de bipôle de système CCHT
- 11.5 Commande de pôle de système CCHT
- 11.7 Commande d'une unité de conversion

11.2 Commande d'un système CCHT  
11.2.1 Commande multiterminale

11.8 Unité de commande de valve  
11.9 Commande de système intégrée en courant alternatif/courant continu

**Figure 12 – Structure hiérarchique d'un système de commande CCHT**

EUROPEAN STANDARD

**EN IEC 60633**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Supersedes EN 60633:1999

English Version

## High-voltage direct current (HVDC) transmission - Vocabulary (IEC 60633:2019)

Transport d'énergie en courant continu à haute tension  
(CCHT) - Vocabulaire  
(IEC 60633:2019)

Hochspannungsgleichstrom-Übertragung (HGÜ) - Begriffe  
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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**EN IEC 60633:2019 (E)****European foreword**

The text of document 22F/480/CDV, future edition 3 of IEC 60633, 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 60633:2019.

The following dates are fixed:

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IEC 60076 (series)	NOTE	Harmonized as EN 60076 (series)
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IEC 60146-1-1	NOTE	Harmonized as EN 60146-1-1
IEC 60146-1-3:1991	NOTE	Harmonized as EN 60146-1-3:1993 (not modified)
IEC 60700-2	NOTE	Harmonized as EN 60700-2
IEC/TR 60919-2:2008	NOTE	Harmonized as CLC/TR 60919-2:2010 (not modified)



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# **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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Edition 3.0 2019-04

# **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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## CONTENTS

FOREWORD .....	3
1 Scope .....	5
2 Normative references .....	5
3 Symbols and abbreviated terms .....	5
3.1 Letter symbols .....	5
3.2 Subscripts .....	6
3.3 Abbreviated terms .....	6
4 Graphical symbols .....	6
5 General terms related to converter circuits .....	6
6 Converter units and valves .....	9
7 Converter operating conditions .....	12
8 HVDC systems and substations .....	15
9 HVDC substation equipment .....	19
10 Modes of control .....	23
11 Control systems .....	23
12 Control functions .....	26
Bibliography .....	37
Figure 1 – Graphical symbols .....	27
Figure 2 – Bridge converter connection .....	27
Figure 3 – Example of a converter unit .....	28
Figure 4 – Commutation process at rectifier and inverter modes of operation .....	29
Figure 5 – Illustrations of commutation in inverter operation .....	30
Figure 6 – Typical valve voltage waveforms .....	31
Figure 7 – Example of an HVDC substation .....	32
Figure 8 – Example of bipolar two-terminal HVDC transmission system .....	33
Figure 9 – Example of a multiterminal bipolar HVDC transmission system with parallel connected HVDC substations .....	33
Figure 10 – Example of a multiterminal HVDC transmission system with series connected HVDC substations .....	34
Figure 11 – Simplified steady-state voltage-current characteristic of a two-terminal HVDC system .....	34
Figure 12 – Hierarchical structure of an HVDC control system .....	35
Figure 13 – Capacitor commutated converter configurations .....	36



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

#### FOREWORD

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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

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- replaced by a revised edition, or
- amended.

## 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 the 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 excluding 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

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