



NSAI
Standards

Irish Standard
I.S. EN 61148:2012

Terminal markings for valve device stacks and assemblies and for power conversion equipment (IEC 61148:2011 (EQV))

I.S. EN 61148:2012

Incorporating amendments/corrigenda issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

<i>This document replaces:</i>	<i>This document is based on:</i> EN 61148:2012	<i>Published:</i> 6 January, 2012
This document was published under the authority of the NSAI and comes into effect on: 24 January, 2012		ICS number: 29.200
NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie
Údarás um Chaighdeáin Náisiúnta na hÉireann		

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61148

January 2012

ICS 29.200

English version

**Terminal markings for valve device stacks and assemblies and for power
conversion equipment
(IEC 61148:2011)**

Marquage des bornes de blocs et
d'ensembles d'éléments de valve et
d'équipement de conversion de puissance
(CEI 61148:2011)

Kennzeichnung der Anschlüsse von
Ventilbauelement-Baugruppen und -
sätzen sowie von Stromrichtergeräten
(IEC 61148:2011)

This European Standard was approved by CENELEC on 2011-11-24. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

I.S. EN 61148:2012

EN 61148:2012

- 2 -

Foreword

The text of document 22/185/FDIS, future edition 2 of IEC 61148, prepared by IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61148:2012.

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) 2012-08-24
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2014-11-24

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

Endorsement notice

The text of the International Standard IEC 61148:2011 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60445

NOTE Harmonized as EN 60445.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-551	-	International Electrotechnical Vocabulary (IEV) - Part 551: Power electronics	-	-
IEC 60146-1-1	-	Semiconductor converters - General requirements and line commutated converters - Part 1-1: Specification of basic requirements	EN 60146-1-1	-

This page is intentionally left BLANK.

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Method of identifying terminals	7
5 Terminal marking for valve device stacks and assemblies	8
5.1 Single and double way connections	8
5.1.1 General	8
5.1.2 Single way connections	9
5.1.3 Double way connections	11
5.1.4 Combination of connections.....	13
5.2 Bi-directional connections	14
5.2.1 Inseparable connections of pair of anti-parallel arms	14
5.2.2 Combinations of pairs of anti-parallel arms	15
6 Marking of external main terminals of integrated conversion equipment.....	18
6.1 A.C. terminals	18
6.1.1 Single-phase a.c. system.....	18
6.1.2 Three-phase a.c. system	18
6.1.3 A.C. conversion equipment with a.c. terminals on supply and load side, for three-phase systems.....	18
6.2 D.C. terminals	19
6.2.1 General	19
6.2.2 A.C./D.C. conversion equipment.....	19
6.2.3 Double conversion equipment with reversible polarity of d.c. terminals	19
6.2.4 D.C. conversion equipment with d.c. terminals on the supply and load sides	19
6.2.5 Terminal for connection to mid-wire conductor.....	20
6.2.6 Conversion equipment with more than one converter section with separate terminal sets on supply and load side.....	20
6.2.7 Conversion equipment in which the external main terminals are formed by the main terminals of the assembly(ies) incorporated in the equipment	20
6.3 Marking of gate terminals	22
6.3.1 General	22
6.3.2 For thyristors	22
6.3.3 For power transistors.....	24
Figure 1 – Typical markings in single arm connections.....	9
Figure 2 – Star connection with two arms.....	10
Figure 3 – Star connection with three arms	10
Figure 4 – Three groups with two arms	11
Figure 5 – Two groups with three arms	11
Figure 6 – Assembly for d.c. chopper	11
Figure 7 – Pair of arms	12
Figure 8 – Bridge connection	12

Figure 9 – Double bridge connection.....	13
Figure 10 – Anti-parallel bridge connection	13
Figure 11 – Series connection of bridges	14
Figure 12 – Fully controllable anti-parallel pairs	14
Figure 13 – Half-controllable anti-parallel pairs	14
Figure 14 – Example for six-phase supply.....	15
Figure 15 – Three-phase star connection	16
Figure 16 – Three-phase star connection with neutral	16
Figure 17 – Double two-phase star connection with neutral.....	16
Figure 18 – Polygon connection.....	16
Figure 19 – Legs for voltage stiff converters	17
Figure 20 – Bridge connection for voltage stiff converter (two-level)	17
Figure 21 – Three-level connection for inverter	18
Figure 22 – Single-phase a.c./d.c. converter	20
Figure 23 – Double converter.....	21
Figure 24 – Three-phase rectifier with two sections and d.c. side centre tap for connection to a mid-wire conductor.....	21
Figure 25 – Direct (or indirect) d.c. converter with two independent sections	21
Figure 26 – Indirect (or direct) a.c. converter	22
Figure 27 – Three-phase star connection with neutral	23
Figure 28 – Bridge connection	23
Figure 29 – Thyristor with gate unit.....	23
Figure 30 – Three-phase star connection with power transistors	24
Figure 31 – Pair of power transistors with anti-parallel diodes.....	24
Figure 32 – Power transistor with gate driver	24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

TERMINAL MARKINGS FOR VALVE DEVICE STACKS AND ASSEMBLIES AND FOR POWER CONVERSION EQUIPMENT

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.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 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.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61148 has been prepared by IEC technical committee 22: Power electronic systems and equipment.

This second edition cancels and replaces the first edition published in 1992. This second edition constitutes a technical revision.

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

- the whole document has been rewritten according to the current Directives;
- the identification codes were deleted according to the withdrawal of IEC 60971;
- examples of terminal marking were added, especially for self-commutated converters.

I.S. EN 61148:2012

61148 © IEC:2011

– 5 –

The text of this international standard is based on the following documents:

FDIS	Report on voting
22/185/FDIS	22/188/RVD

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

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

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

TERMINAL MARKINGS FOR VALVE DEVICE STACKS AND ASSEMBLIES AND FOR POWER CONVERSION EQUIPMENT

1 Scope

This International Standard is applicable to the terminal markings for the main circuits of valve device stacks and assemblies, and of integrated conversion equipment. The terminal markings refer to stacks, assemblies and equipment comprising semiconductor valve devices.

NOTE 1 Terminal markings for auxiliary circuits, including gate terminals and non-integrated conversion equipment with separate manufacturing of its components and their interconnection only after installation on site, are not considered in this standard.

For such equipment the relevant standards, if any, for the individual components apply.

Gate terminal markings are given in 6.3.

Terminal markings for other circuits such as protective conductor are not considered in this standard.

The object of this standard is to specify a logical alphanumeric marking system for the identification of the external main terminals of the main power circuits in a stack, valve device assembly or integrated conversion equipment, which is applicable for the purpose of reference in circuit diagrams, catalogues, descriptions, and information exchange and storage.

In the case of stacks and assemblies, alphanumeric terminal marking systems are indicated for those converter connections which are the most important and most commonly used ones.

Terminal marking systems making use of graphic symbols or identifying colours are not considered in this standard.

NOTE 2 The terminals of auxiliary circuits should be marked such that they may be clearly identified.

2 Normative references

The following referenced documents are indispensable for the application 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 60050-551, *International Electrotechnical Vocabulary – Part 551: Power electronics*

IEC 60146-1-1, *Semiconductor converters – General requirements and line commutated converters – Part 1-1: Specification of basic requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-551, IEC 60146-1-1 and the following apply.

3.1

external main terminals

terminals of the main power circuit of the stack, assembly or equipment to which the external power supply or the load are connected

NOTE 1 In the following clauses this term is abbreviated to "terminals".

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-