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INTERNATIONAL STANDARD

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HORIZONTAL STANDARD

NORME HORIZONTALE

Industrial systems, installations and equipment and industrial products – Identification of terminals within a system

Systèmes industriels, installations et appareils, et produits industriels – Identification des bornes dans le cadre d'un système

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL SYSTEMS, INSTALLATIONS AND EQUIPMENT AND INDUSTRIAL PRODUCTS – IDENTIFICATION OF TERMINALS WITHIN A SYSTEM

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International Standard IEC 61666 has been prepared by IEC technical committee 3: Information structures, documentation and graphical symbols

It has the status of a horizontal standard in accordance with IEC Guide 108.

This second edition cancels and replaces the first edition of IEC 61666 published in 1997. This edition constitutes a technical revision.

This edition includes the following substantial changes with respect to the previous edition:

- the terminology used in the publication has been adapted to the one used in IEC 81346-1 Ed.2;
- a more comprehensive description of the designation principles is provided;
- additional examples illustrating terminal designations related to the function aspect and location aspect are provided;
- an additional example illustrating the use of terminal designation sets is provided;
- the former informative Annex A has been turned into a clause in the standard.

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

FDIS	Report on voting
3/1001/FDIS	3/1008/RVD

Full information on the voting for the approval of this 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- withdrawn,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.

INDUSTRIAL SYSTEMS, INSTALLATIONS AND EQUIPMENT AND INDUSTRIAL PRODUCTS – IDENTIFICATION OF TERMINALS WITHIN A SYSTEM

1 Scope

This International Standard establishes general principles for the identification of terminals of objects within a system, applicable to all technical areas (for example mechanical engineering, electrical engineering, construction engineering, process engineering). They can be used for systems based on different technologies or for systems combining several technologies.

Requirements for marking of terminal designations on products are not part of this publication.

NOTE The standard is based on the general principles for the structuring of systems including structuring of the information about systems, established in the International Standard ISO/IEC 81346 series, published jointly by IEC and ISO.

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 60417, *Graphical symbols for use on equipment*

IEC 60445, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals and conductor terminations*

IEC 60757, *Code for designation of colours*

IEC 61082-1:2006, *Preparation of documents used in electrotechnology – Part 1: Basic rules*

IEC 81346-1, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Rules*

IEC 81714-3, *Design of graphical symbols for use in the technical documentation of products – Part 3: Classification of connect nodes, networks and their encoding*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
object
entity treated in a process of development, implementation, usage and disposal

NOTE 1 The object may refer to a physical or non-physical “thing”, i.e. anything that might exist, exists or did exist.

NOTE 2 The object has information associated to it..

[IEC 81346-1, definition 3.1]

3.2
system
set of interrelated objects considered in a defined context as a whole and separated from their environment

NOTE 1 A system is generally defined with the view of achieving a given objective, e.g. by performing a definite function.

NOTE 2 Elements of a system may be natural or man-made material objects, as well as modes of thinking and the results thereof (e.g. forms of organisation, mathematical methods, programming languages).

NOTE 3 The system is considered to be separated from the environment and from the other external systems by an imaginary surface, which cuts the links between them and the system.

NOTE 4 The term “system” should be qualified when it is not clear from the context to what it refers, e.g. control system, colorimetric system, system of units, transmission system.

NOTE 5 When a system is part of another system, it may be considered as an object as defined in this standard.

[IEV 151-11-27, modified]

3.3
aspect
specified way of viewing an object

[IEC 81346-1, definition 3.3]

3.4
function
intended or accomplished purpose or task

[IEC 81346-1, definition 3.5]

3.5
product
intended or accomplished result of labour, or of a natural or artificial process

[IEC 81346-1, definition 3.6]

3.6
component
product used as a constituent in an assembled product, system or plant

[IEC 81346-1, definition 3.7]

3.7
identifier
attribute associated with an object or system to unambiguously distinguish it from other objects or systems within a specified domain

[IEC 81346-1, definition 3.10, modified]

3.8
reference designation
identifier of a specific object formed with respect to the system of which the object is a constituent, based on one or more aspects of that system

[IEC 81346-1, definition 3.11]

3.9
terminal
point of access to an object intended for connection to an external network

NOTE 1 The connection may refer to: a) a physical interface between conductors and/or contacts, or piping and/or duct systems to provide a signal, energy or material flow path; b) an association of functional nature established between logical elements, software modules, etc. for conveying information.

NOTE 2 The external networks may be of different nature and accordingly they may be classified. IEC 81714-3 provides such classifications.

3.10
terminal designation
identifier of a terminal with respect to the object to which it belongs, related to one defined aspect

3.11
terminal designation set
group of terminal designations, each identifying the same terminal from different aspects

3.12
object designation
identifier of a specific object in a given context

NOTE Examples of such designations are: reference designation, type number, serial number, name.

[IEC 61355, 3.13]

4 Terminal designation

4.1 General

Terminals establish the interface of objects for connecting them to other objects in a network, for example connecting to an electrical network, logic function network, logic network in software, piping network, etc.

An object may be associated with any number of terminals.

Each terminal shall be unambiguously identified with respect to the object itself as well as to the system to which this object belongs.

Figure 1 illustrates the principle of constructing an unambiguous terminal designation.

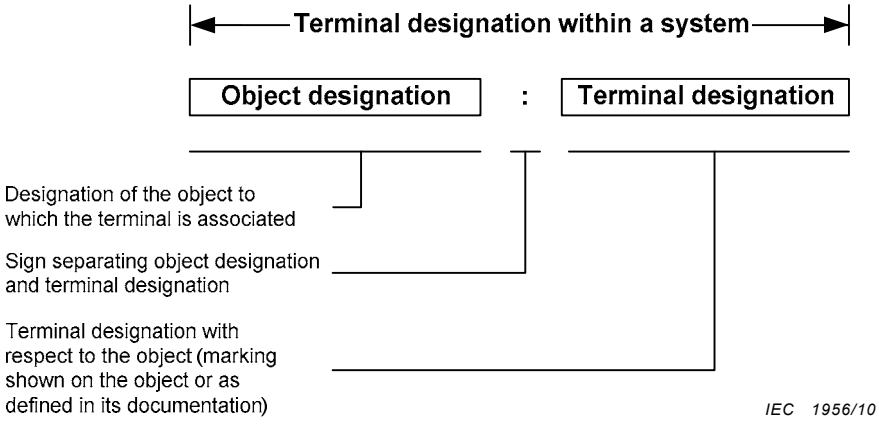


Figure 1 – Principle of terminal designation

The terminal designation shall consist of the terminal marking as defined by the manufacturer or designer of the object used as component in the system or of the identifier as defined in the documentation of the object.

If it is necessary to indicate the aspect of the terminal that the terminal designation relates to (for example within human readable presentations), the terminal designation shall be preceded by a prefix sign identifying the aspect.

NOTE 1 This prefix sign will exist in addition to the separator sign.

NOTE 2 The prefix sign is considered to be part of the terminal designation.

The terminal designation shall be formed according to 4.2, 4.3, or 4.4.

The terminal designation shall be presented, in documentation, in accordance with IEC 61082-1.

The object designation shall unambiguously identify the object to which a terminal is assigned. This implies that an object designation shall be (or be made) unambiguous in a specified context, i. e. within the considered network.

NOTE 3 This requirement can be fulfilled by reference designations in accordance with IEC 81346-1 and such designations are therefore used in the following text.

4.2 Designation of terminals with respect to the product aspect

A terminal designation provided with respect to the product aspect shall consist of the designation of the physical terminal that is:

- marked on the product; or
- assigned by the manufacturer; or
- defined in relevant IEC publications; or
- known from convention.

Examples of the three last possibilities are a dual-in-line package or a contactor.

NOTE 1 Some product standards such as IEC 60034-8, IEC 60191-3 and IEC 60616 include requirements for terminal markings of products.

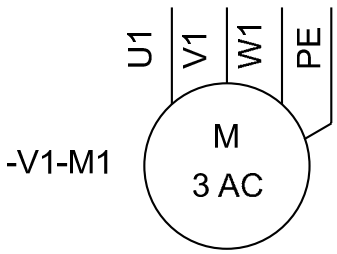
If indication of the product aspect is needed in the terminal designation, the prefix sign “-“ shall be applied.

NOTE 2 The prefix sign is considered to be part of the terminal designation.

If there is no designation of the physical terminal assigned by the manufacturer of the product, arbitrary terminal designations shall be assigned and shall be explained in the document or in supporting documentation. The same applies also if the designation assigned by the manufacturer is, for some reason, insufficient for unambiguous identification. See also Annex A .

If the designation of the physical terminal has the form of a graphical symbol or colour, an equivalent standardized letter symbol may be used in the documentation, for example, PE instead of the graphical symbol for protective earth (see IEC 60445), BU for blue colour. Letter codes for colours shall be in accordance with IEC 60757.

Figure 2 shows an example of designation of terminals for a motor.



-V1-M1 Reference designation for the motor related to the system of which it is a constituent

U1, V1, W1 Terminal designations, as marked on the motor

PE Terminal designation, for which the graphical symbol IEC 60417-5019 (2006-08), ⏚ may be used on the motor

Example of designation of terminals: -V1-M1:U1 and -V1-M1:PE

NOTE In this example it has not been considered necessary to indicate to which aspect the terminal designation relates.

IEC 1957/10

Figure 2 – Example of designation of terminals for a 3-phase squirrel-cage motor

4.3 Designation of terminals with respect to the function aspect

A terminal designation provided with respect to the function aspect shall consist of a designation based on the function(s) related to the terminal.

For functions of devices described by a data sheet or similar supporting document, a function terminal designation should be based on the function label associated with terminal name defined in the data sheet or the similar supporting document.

NOTE 1 Such terminal designations are for example defined in accordance with application note A00317 of IEC 60617-S00317 (2001-07).

NOTE 2 Examples in IEC 60617 do not always provide labels that are unambiguous function terminal designations. Whenever used as terminal designations, such labels need to be made unambiguous.

If indication of the function aspect is needed in the terminal designation, the prefix sign "=" shall be applied.

NOTE 3 The prefix sign is considered to be part of the terminal designation.

Figure 3 shows an example of a device with function labels and terminal markings of the terminals shown.

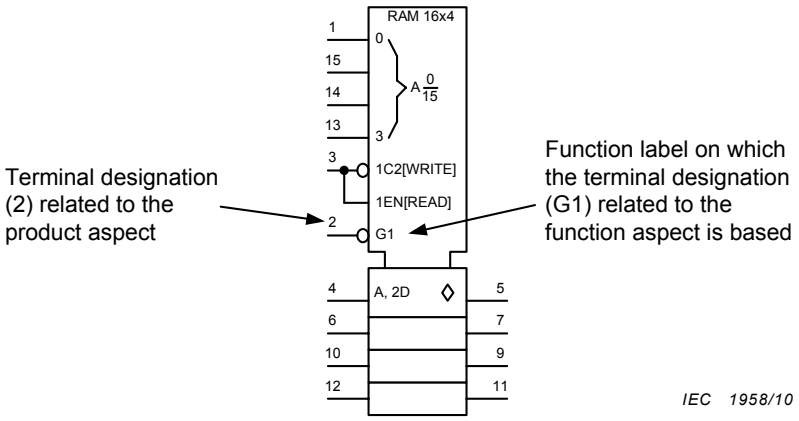


Figure 3 – A device shown with function labels on which the terminal designations related to the function aspect are based, as well as terminal designations (pins) related to the product aspect

Figure 4 shows an example of a motor starter used as component with known functionality but unknown physical implementation (i.e. the product to be used has not yet been selected). The terminal designations are assigned from the function aspect by the designer of the complete system in which such a motor starter may form part. These designations are used during the system design and, during the detailed engineering, supplemented or replaced (by computer-aided automatic means) by the terminal designations from the product aspect assigned by the manufacturer of the product used for the implementation in each specific case.

NOTE 4 Clause 11 of IEC 61082-1 describes a mapping method for this.

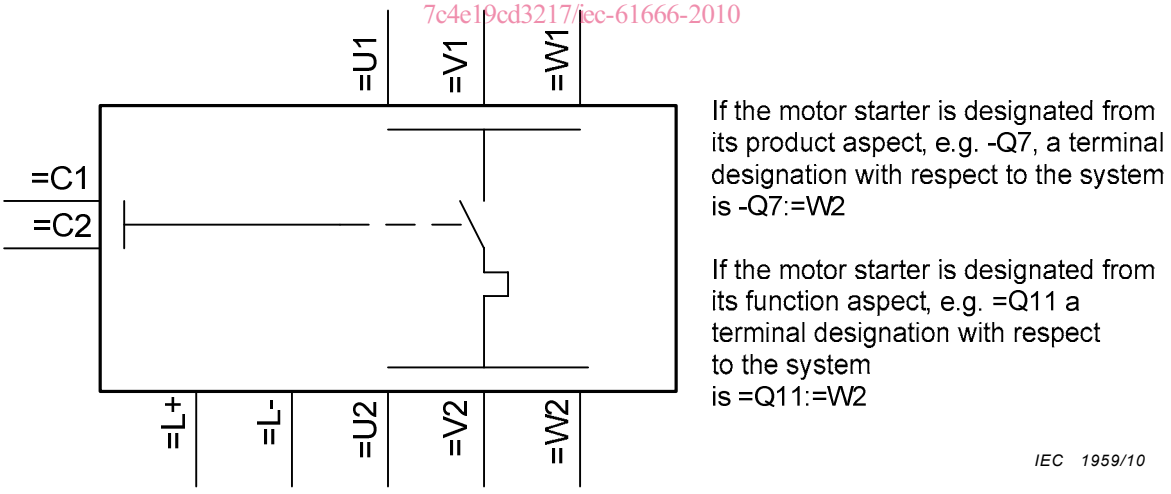


Figure 4 – Example of a symbol for a motor starter provided with terminal designations related to the function aspect

4.4 Designation of terminals with respect to the location aspect

A terminal designation provided with respect to the location aspect shall consist of a designation based on the location related to the terminal.

If the indication of the location aspect is needed in the terminal designation, the prefix sign “+“ shall be applied.