International Electrotechnical Commission

IEC 60617 - Graphical Symbols for Diagrams

(requires password)

Welcome to the IEC 60617 database

IEC 60617 contains graphical symbols for use in electrotechnical diagrams. All the parts (Ed. 2 or 3) of the previously published IEC 60617 have been incorporated into this database that currently includes some 1750 symbols. The database is the official source of IEC 60617.

Subscriptions and End-User Restrictions

Access to the database is on a subscription basis. Subscriptions can be purchased through the IEC National Committees, National Committee-appointed Sales Outlets, or directly from the IEC Web Store (simply search for IEC 60617). All subscriptions are subject to the customer agreeing to the IEC Web Store Product(s) Licence Agreement.

Scope

The following areas are covered in the database:

- Conductors and connecting devices
- Basic passive components
- Semiconductors and electron tubes
- Production and conversion of electrical energy
- Switchgear, controlgear and protective devices
- Measuring instruments, lamps and signalling devices
- Telecommunications transmission, switching and peripheral equipment
- Architectural and topographical installation plans and diagrams
- Binary logic elements
- Analogue and hybrid elements

New metadata and search capability

The incorporation of the symbols into the database has been accompanied by the addition of a considerable amount of new metadata not present in the previous publication (symbol name, alternative names, keywords, remarks, etc.) and links to related symbols and application notes. The database also provides classified views (by shape, function and application) and a search facility. It is therefore a much richer and more user friendly tool for those who need to understand and apply graphical symbols in electrotechnical diagrams.

Maintenance

The database is maintained by a validation team appointed by the IEC National Members. Requests for modifications and new symbols are processed via change requests addressed to the validation team by IEC National Committees and TCs.

National Committees

National Committees should send a list of staff members who are to be authorized to access the database. The list should include the name and username for each person (username is that currently used to access working documents on the IEC web site). The list should be sent by email to

Ms. Azar Tahbazian.

TC/SC officers

IEC TC/SC chairmen and secretaries, as well as PT/WG/MT convenors can request special access from the IEC Central Office by clicking here.

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Queries

Please send any queries or comments to the IEC Customer Service Centre.

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English   French

Introduction

The IEC 60617 database is organized as a set of "data sheets" describing the graphical symbols and their attributes. Please click on "General description" on the left panel to see how the database is structured, how to use graphical symbols and how to process requests for new ones.

This database is used as a reference by the following IEC member countries:

> Austria, Belgium, Canada, Czech Republic, Finland, Germany, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Sweden, Switzerland, Ukraine

Languages

The database is bilingual with all symbol data available in English and French. While viewing a symbol data sheet you can switch back and forth between the two languages.

Links

All items in blue, including the arrow triangles in the categorized views, represent links to other elements or to specific action.

Finding a symbol

The IEC 60617 database provides two methods for finding a symbol:

1. Search function

> The query is processed in the language specified. You can use an asterix (*) as a wildcard and combine two search terms with a boolean "AND" or "OR" operator. The following fields are used in constructing the query: Name, Alternative names, Keywords, Earlier published in (e.g. 03-01-15) and Symbol identity number (e.g. S00823).

2. Categorized views

> Symbols are categorized by symbol identity number, keyword, application class, function class, shape class, status level and earlier publication. After selecting a view click on the blue arrow to expand the list. Clicking on an item reference (in blue) brings up the detail page. Within the detail page there may be further links to related symbols, application notes, etc.

Snapshots

The IEC Central Office produces periodically a snapshot of the

database contents in PDF format. Please click on "Snapshots" in the left panel for further information.

Queries

Should you have any questions concerning your subscription (expiration date, renewal) or the contents of the database please contact the IEC Customer Service Centre.

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IEC 60617 - Graphical Symbols for Diagrams

General description

Structure of the database
How to use existing symbols
Choice of symbols
Symbol size
Orientation of symbols
Representation of terminals
How to create a new symbol from existing elements
How to process requests for new symbols

Structure of the database [top]

IEC 60617 contains some 1750 graphical symbols. It defines an international "pictorial language" used in electrotechnical diagrams. In a way similar to how words can be combined to form more complex expressions and meanings, the pictorial representations of this standard can be combined to build more expressive or specialised symbols.

The concept "graphical symbol" is normally defined as a *visually perceptible figure used to transmit information independently of language.*

For the purposes of the IEC 60617 the notion of a graphical symbol is somewhat broader to encompass *objects that contain information on concepts including their associated graphical representations.* Each object has an identifier (symbol identity number), a name, a status level, a graphical representation and a set of optional attributes. These are described as follows:

Symbol identity number	an identifier of the form "Snnnnn" where n is an integer from 0 to 9. The numbers are sequential but carry no semantic meaning.
Name	a short description of the meaning of the symbol
Alternative names	synonymous, "almost synonymous" and possibly branch specific names, etc. under which the symbol might also be known

Status level	the status of the symbol in relation to the standardization workflow. When a symbol is approved, its status is set to "Standard". If the symbol is later replaced by another, or if it is deemed technically obsolete, its status becomes "Obsolete - for information only". In the case of technical obsolescence the symbol may still be used, although it is no longer maintained. (Other status levels are applied during the standardization procedure, such as "Proposed", "Draft" and "Rejected")
Released on	the date at which the symbol was released as Standard in the database for public use
Obsolete from	the date at which the status level of the symbol was set to "Obsolete - for information only"
Replaces	the identity number of the symbol replaced by the present one
Replaced by	the identity number of the symbol replacing the present one
Application notes	links to common descriptive notes with additional relevant information, normally shared among several symbols The former Part 12 and 13 of IEC 60617 contained some extensive general textual sections. These are also entered into the database as application notes, referenced from the symbols where they mainly apply.
Remarks	additional remarks, mostly commenting particulars of the shown graphics, but sometimes also providing application hints
Symbol restrictions	possible restrictions with regard to the application of the symbol
Form	designation of a particular form of the symbol
Alternative forms	identity numbers of symbols having the same meaning but an alternative form
Applies	identity numbers of symbols used in the construction of the present symbol
Applied in	identity numbers of symbols where the present one is being used as an element
Application class	document kinds (as defined in IEC 61082-1) in which the symbol is intended to be applied
Function class	one or more classes defined in IEC 61346-2, to which the present symbol belongs
Shape class	primary shapes that characterize the symbol
Keywords	a listing of keywords to facilitate retrieval
Published in	reference numbers to other known publicly available symbol standards in which the symbol is presently also published

Earlier published in	the reference number of the symbol in the earlier printed version of the standard. Symbols not found in the earlier version carry the publication reference "IEC 60617 Database"
Source reference	reference numbers to publicly available documents used as source for the standardization of the symbol

How to use existing symbols

The symbols of IEC 60617 are intended for use in diagrams of different kinds and different levels of detail. The entry "Application Class" indicates for which kind(s) of diagram a symbol is intended. The defined application classes are:

Overview diagram (including Block diagrams, "Single-line diagrams", etc.)

Relatively simple diagram, often using single line representation, showing the main interrelations or connections among the items within a system, subsystem, installation, part, equipment, software etc.

NOTE – This document kind can serve as an overview on different levels for circuit diagrams and function diagrams as well.

Function diagram (including Logic-function diagrams, Equivalent-circuit diagrams, etc.)

Diagram showing details of theoretical or ideal operation of a system, sub-station, installation, part, equipment, software, etc, by means of theoretical or ideal circuits without necessarily taking into account the means used for implementation.

Circuit diagram (including Terminal-function diagrams, "Schematic diagrams", etc.)

Diagram showing the implementation of the circuits of a a system, sub-station, installation, part, equipment, software, etc, depicting parts and connections by means of graphical symbols arranged to show the functions without necessarily taking into account physical sizes, shapes, or locations of the items.

Connection diagram (including Connection diagrams, Unit connection diagrams, Interconnection diagrams, Terminal-connection diagrams, Cable diagrams, etc.)

Diagram showing or listing the connections of an installation or equipment.

Installation diagram

Installation drawing showing the connections between items.

Network map

Overview diagram showing a network on a map, for example generating or transforming stations and power lines, telecommunication equipment and transmission lines.

Rules for the application of the symbols are generally contained in IEC 61082. The following paragraphs contain a few of the basic application rules from this standard. For further guidance on the use of symbols/preparation of diagrams, please refer to the different parts of IEC 61082.

Choice of symbols [top]

In cases where there are alternative forms of graphical representation for one concept (indicated e.g. by "Form 1", "Form 2", "Simplified form") the selected symbol shall be:

a) the preferred form, if practical; or else

b) the form of symbol appropriate for the particular application class.

Some symbols have "general symbol" as part of the name. These symbols are usually the source for a whole group of more specific symbols. The general symbols are to be used in cases where the more specific ones are neither required nor desired.

Symbol size [top]

The meaning of a symbol is defined by its shape and by its content. The size and line thickness do not affect the meaning.

The minimum size of a symbol shall be such that the rules for line thickness, spacing of lines, lettering, etc. can be applied.

Within these constraints, the symbols intended for installation diagrams and network maps may be enlarged or reduced to suit the scale of the plan or map.

The symbols in the database are shown on a grid pattern with a modulus M to specify symbol proportions. For readability the modulus shall be equal to or greater than the lettering height.

In some cases, it may be necessary or advantageous to use different sizes of symbols:

– to increase the number of inputs or outputs;
– to facilitate the inclusion of additional information;
– to emphasise certain aspects; and

– to facilitate the use of symbol as a qualifying symbol.

When enlarged or reduced the general shape of the symbol should be maintained and, if practical, also the relative proportions.

For detailed guidance of the design of symbols and their adaptation to the use in a CAD environment, please refer to the different parts of ISO 81714-1 and IEC 81714-2.

Orientation of symbols [top]

Most symbols of IEC 60617 are designed for a signal flow from left to right. This principle should also be maintained in all diagrams as a general rule and the symbols preferably shown as in the standard.

In some cases it is necessary to deviate from the basic orientation of the symbols. Therefore the symbols may be turned or mirror-imaged if the meaning will not thereby be changed.

In other cases it may be necessary to redesign the symbol to suite different orientations.

Block symbols, binary logic element symbols, and analogue element symbols, containing letters, qualifying symbols, graphs, or input/output labels, shall be oriented so that they can be read when viewing the diagram from the bottom edge or from the right-hand edge

Representation of terminals [top]

Most symbols are shown without explicit symbols for any terminals. Generally, it is not necessary to add symbols for terminals, brushes, etc. to the symbols for components. In a few cases, the terminals are part of the symbol shown in the database and shall be shown also when applied in a diagram.

How to create a new symbol from existing elements [top]

When the graphical symbol required is not found in the database, it may be possible to create one from the existing ones. Pick the symbol for the basic concept and then combine it with one or more appropriate supplementary symbol.

Supplementary symbols are:

– primarily symbols explicitly depicted as "Qualifiers" in their application class, or,

– principally, any other symbol in the database, if necessary suitably modified in size.

The supplementary symbols can be placed inside, outside or across the basic symbol. No simple rule can be given, since the placement to a high degree depends on the shapes of the symbols, available

space in or around the basic symbol, etc.

Do not overload the symbol. Limit the number of supplementary symbols to what is required to emphasise the wanted concept.

For further guidance on the design of symbols, please refer to ISO 81714-1 and IEC 81714-2 *(Design of graphical symbols for use in the technical documentation of products - Part 1: Basic rules* and *Part 2: Specification for graphical symbols in a computer sensible form including graphical symbols for a reference library, and requirements for their interchange).*

For symbols for binary logic, analogue and hybrid elements (primarily symbols numbered S01463 to S01806, formerly contained in IEC 60617-12 and -13) additional guidance is provided in IEC/TR 61734 *(Application of IEC 60617-12 and IEC 60617-13 standards)*, and IEC/TR 61352 *(Mnemonics and symbols for integrated circuits*).

The database contains numerous examples on how combinations are done. Look at a complex symbol and follow the links under the attribute "Applies" to see how the symbol is built from a set of more simple ones.

A symbol created as a combination of already existing symbols and in line with the rules given in ISO 81714-1 and IEC 81714-2 is considered to be in line with the IEC standard.

How to process requests for new symbols [top]

If there is a need for a symbol that cannot be satisfied with the already existing set of symbols or by combinations of these symbols it might be necessary to create a new one, and to get this internationally standardised.

In such cases the appropriate procedure is to describe the need to your National Committee of IEC. The description should preferably be accompanied with a proposal, including the graphics as well as the textual descriptions. Use the information in the database as a model.

Your National Committee will then, after possible discussion and consultation, forward the proposal to the relevant Technical Committee in IEC: TC3 Information structures, documentation and graphical symbols. The symbol will be initially entered into the database with the status: "Proposed".

The proposal will then be quickly reviewed and evaluated by a Validation Team composed of representatives from the different National Committees, leading to a decision whether or not the proposal should be the subject for further work, and if the "normal" or an "extended" procedure should be used.

In case of a negative decision the status of the proposed work will be changed to "Rejected" and the reason will be explained.

In the case of a positive decision the proposal will be given the appropriate technical form, and the status changed to "Draft". The

proposal will then be subject to formal vote by the Validation Team and if accepted, the status will be changed to "Standard".

With this fully electronic procedure the processing time from the moment that the Technical Committee gets the proposal until the possible release should be less than 20 weeks in the case of the "normal" procedure.

If the proposed graphical symbols are concerned with an entirely new technical area another approval mechanism is used, namely the "extended" procedure, which involves the National Committees directly. In that case the processing time is approximately 56 - 74 weeks.