JIS

JAPANESE
INDUSTRIAL
STANDARD

JIS C 0617-1 : 2011

Graphical symbols for diagrams—
Part 1: General information, general index. Cross-reference tables

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C 0617-1 : 2011

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Contents

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law.

Consequently **JIS C 0617-1** : 1999 is replaced with this Standard.

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Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public or utility model right. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public or the utility model right.

JIS C 0617 series consists of the following 13 parts under the general title "*Graphical symbols for diagrams*":

Part 1: General information, general index. Cross-reference tables

Part 2: Symbol elements, qualifying symbols and other symbols having general application

Part 3: Conductors and connecting devices

Part 4: Passive components

Part 5: Semiconductors and electron tubes

Part 6: Production and conversion of electrical energy

Part 7: Switchgear, controlgear and protective devices

Part 8: Measuring instruments, lamps and signalling devices

Part 9: Telecommunications: Switching and peripheral equipment

Part 10: Telecommunications—Transmission

Part 11: Architectural and topographical installation plans and diagrams

Part 12: Binary logic elements

Part 13: Analogue elements

Graphical symbols for diagrams— Part 1: General information, general index. Cross-reference tables

1 Scope

This Japanese Industrial Standard specifies the general information of graphical symbols for diagrams specified in the standard series of **JIS C 0617**.

> NOTE : The indices and cross-reference tables of graphical symbols of respective parts that constitute the standard series of **JIS C 0617** are given in Annex A to Annex D.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS C 0452-2 *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 2: Classification of objects and codes for classes*

JIS C 0617 (standard series) *Graphical symbols for diagrams*

JIS C 1082-1 *Preparation of documents used in electrotechnology—Part 1: General requirements*

JIS Z 8222-1 *Design of graphical symbols for use in the technical documentation of products—Part 1: Basic rules*

JIS Z 8222-2 *Design of graphical symbols for use in the technical documentation of products—Part 2: Specification for graphical symbols in a computer sensible form, including graphical symbols for a reference library, and requirements for their interchange*

IEC 60617 *Graphical symbols for diagrams—12-month subscription to online database comprising parts 2 to 13 of IEC 60617*

3 Structure

The standard series of **JIS C 0617** consists of several parts as set out below:

Part 1: *General information, general index. Cross-reference tables*

Part 2: *Symbol elements, qualifying symbols and other symbols having general application*

Example 1 Outlines and enclosures, qualifying symbols for the kind of current and voltage, variability, direction of force, motion and flow etc., mechanical controls, earth and frame connections, ideal circuit elements.

Part 3: *Conductors and connecting devices*

Example 2 Conductors; flexible, screened or twisted, coaxial conductor, terminals, junctions, plugs and sockets, cable sealing ends.

Part 4: *Passive components*

Example 3 Resistors, capacitors, inductors, piezoelectric crystals, electret, delay lines.

Part 5: *Semiconductors and electron tubes*

Example 4 Diodes, transistors, thyristors, electronic tubes, radiation detectors.

Part 6: *Production and conversion of electrical energy*

Example 5 Windings, generators, motors, transformers, power converters.

Part 7: *Switchgear, controlgear and protective devices*

Example 6 Contacts, switches, temperature-, proximity- and touch-sensitive switches, switchgear and controlgear, motorstarters, all-or nothing relays, measuring relays, fuses, gaps, arresters.

Part 8: *Measuring instruments, lamps and signalling devices*

Example 7 Indicating, integrating and recording instruments, thermocouples, clocks, position and pressure transducers, lamps, horn, bell.

Part 9: *Telecommunications: Switching and peripheral equipment*

Example 8 Switching systems, selectors, telephone sets, telegraph and data apparatus, transducers, recorders and reproducers.

Part 10: *Telecommunications—Transmission*

Example 9 Antennas, radio stations, waveguides, one-, two- or multi-port devices, masers, lasers, signal generators, changers, threshold devices, modulators, demodulators, discriminators, concentrators, multiplexers, frequency spectrum diagrams, fibre optics transmission lines and devices.

Part 11: *Architectural and topographical installation plans and diagrams*

Example 10 Generating stations and substations, networks, cabled distribution systems for sound and television, installation symbols for switches, socket outlets, lighting outlets, etc.

Part 12: *Binary logic elements*

Example 11 Qualifying symbols, dependency notation, combinative and sequential elements such as buffers, drivers, coders, arithmetic elements, delay elements, bitable, monostable and astable elements, shift registers and counters, memories.

Part 13: *Analogue elements*

Example 12 Amplifiers with qualifying symbols, function generators, coordinate converters, electronic switches.

4 Concept of graphical symbols

4.1 General

The names of the devices symbolized and concepts in the standard series of **JIS C 0617** are in conformance with those in **IEC 60617**.

4.2 Descriptions of item names used for provisions of graphical symbols

The descriptions of item names used for the standard series of **JIS C 0617** are given in table 1.

In addition, the English item names corresponding to **IEC 60617** are given as reference.

Table 1 Descriptions of item names used for provisions of graphical symbols

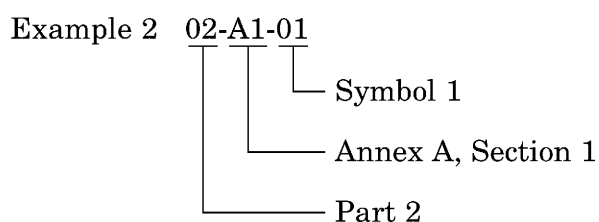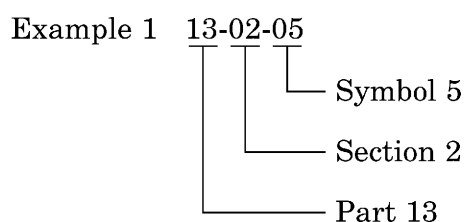| Item	Description
Classification number of graphical symbols	Classification number in the form of xx-yy-zz, where x, y and z are expressed with integers from 0 to 9 and A. xx: Number of part yy: Number of section zz: Graphical symbol number in the number of section NOTE: The graphical symbols with A attached to the section numbers, which were specified in the previous edition, are now deleted.
Symbol identity number	An identifier of a graphical symbol of the form "Snnnnn" where n is an integer from 0 to 9. This number corresponds to the symbol identity number specified in **IEC 60617**, and carries no semantic meaning.
Name	Short description of the meaning of the symbol.
Alternative names	Synonymous, "almost synonymous" and possibly branch specific meanings, etc. under which the symbol might also be known.
Form	Designation of a particular form of the symbol. When there are graphical symbols having alternative forms, it is described as form 1, form 2 .... .
Alternative forms	Identity numbers of symbols having the same meaning but an alternative form.
Application notes	Links to common descriptive notes with additional relevant information. Application notes, which are normally shared among several symbols, are described in another page indicated with the application number. The application note number is indicated in the form of Annnnn, where n is an integer from 0 to 9. This number corresponds to application notes of **IEC 60617**, and carries no semantic meaning.
Application class	Document kinds in which the symbol is intended to be applied. It is defined in **JIS C 1082-1**.
Function class	One or more classes defined in **JIS C 0452-2**, to which the present symbol belongs. Those given in parentheses are codes for classes.
Shape class	Primary shape that characterizes the symbol.
Symbol restrictions	Possible restrictions with regard to the application of the symbol.
Remarks	Additional information of the graphical symbol concerned.
Applies	Identity numbers of symbols (symbol element, qualifying symbol and general symbol) used in the construction of the present symbol.
Applied in	Identity numbers of symbols where the present one is being used as an element.
Keywords	Listing of key words to facilitate retrieval.

Table 1 (concluded)

Item	Description	
NOTE	Reference information that supplements the matter related to graphical symbols etc. In addition, there are the following items as reference information of only **IEC 60617**.	
	Status level	The status of the symbol in relation to **IEC 60617** standard maintenance workflow. When the symbol is approved, the 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.
	Released on	A date at which the symbol was released as Standard as part of **IEC 60617**.
	Obsolete from	A date at which the status level of the symbol was set to "Obsolete-information only" in **IEC 60617**.

4.3 Numbering of graphical symbols

Each graphical symbol is attached with a graphical symbol number. This number is composed of three groups:

— the first group (two digits) represents the number of the part of the **JIS C 0617** (standard series);

— the second group represents the number of the section of the **JIS C 0617** (standard series);

— the third group (two digits) represents the consecutive number of the section.

Each one of these groups is separated from the next one by hyphen.

Example 1   13-02-05

    └─ Symbol 5

   └─── Section 2

  └────── Part 13

Example 2   02-A1-01

    └─ Symbol 1

   └─── Annex A, Section 1

  └────── Part 2

4.4 Application class

The graphical symbols specified in the standard series of **JIS C 0617** are used for the purpose of indicating the required information in detailed or simplified manner in various electrical circuit diagrams. "Application class" for every graphical symbol in the attribute elements given in table 1 indicates what the application for the graphical symbol is. Graphical symbols for diagrams are classified as given in table 2 based on the definitions of **JIS C 1082-1**.

Table 2　Application classes of graphical symbols for diagrams

Application class	Description
Overview diagram	A comparatively simple diagram using a single line representation. It indicates the main correlation or connection among items such as a block diagram or a single line diagram, a system, a subsystem, equipment, a component, a device and software. It is used as a general drawing of different levels concerning a circuit diagram or a function diagram.
Function diagram	A diagram indicating the theoretical or ideal operation of a system, a subsystem, equipment, a component, a device, software, and so on. It is expressed by a logical or ideal circuit, and implementation tools are not always taken into consideration. It includes logical function diagrams or equivalent circuit diagrams.
Circuit diagram	A diagram indicating the circuit of a system, a subsystem, equipment, a component, a device, software, and so on. It indicates the interconnection of two or more graphical symbols in order to express function without always taking the physical dimension, shape or position of each item into consideration. It is not necessarily required to take the physical dimension, shape or position of each item into consideration. This includes terminal-function diagrams or schematic diagrams.
Connection diagram	A drawing indicating installation or connection of devices. This also includes unit connection diagrams, terminal-connection diagrams and cable diagrams.
Installation diagram	An installation diagram indicating connection of each of the related items.
Network map	It is used, for example, as a general drawing indicating the network of generating stations and substations, power lines, telecommunications equipment, communication lines and so on in the shape of a map (concerning the depiction of the surrounding area of installation in the graphic display of installation).
Qualifiers only	A graphical symbol added to other graphical symbols in order to indicate additional information.

4.5　Function class

　The function class of graphical symbols shall be indicated by one character code as shown in the following based on the definitions of **JIS C 0452-2**.

— Functional attribute only (−)

— Converting variable to signal (B)

— Storing, preserving, accumulating electricity or storing memory (C)

— Supplying radiation energy or thermal energy (E)

— Protecting (F)

— Generating flow (G)

— Processing signal or information (K)

— Supplying mechanical energy (M)

— Presenting information (P)

— Switching or changing by control (Q)

— Restricting or stabilizing (R)

— Converting manual operation into signal (S)

— Converting but maintaining kind (T)

— Holding at a prescribed position (U)

— Treating material or product (V)

> NOTE : The related graphic symbols are not standardized.

— Guiding or transporting (W)

— Connecting (X)

4.6 Selection of graphical symbol

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 to suit the purpose of use are not standardized.

4.7 Size of graphical symbol

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 **JIS C 0617** 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 **JIS Z 8222-1** and **JIS Z 8222-2**.

4.8 Orientation of symbols

Most symbols of **JIS C 0617** 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.

4.9 Representation of terminals

Most symbols are shown without explicit symbols for any terminals. Generally, it is not necessary to add symbols for terminals, bushings, etc. to the symbols for components. In a few cases, the terminals are part of the symbol shown in **JIS C 0617** and shall be shown also when applied in a diagram.

4.10 How to create a new symbol from existing elements

When the graphical symbol required is not found in **JIS C 0617**, 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:

— primary symbols explicitly depicted as "Qualifying symbols" in their application class, or,

— principally, any other symbol registered, 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.

JIS C 0617 contains numerous examples on how combinations are done. Look at a complex symbol and follow the links under the attribute "Applies" (see table 1) to see how the symbol is built from a set of more simple ones.