

JIS

JAPANESE INDUSTRIAL STANDARD

Circuit Diagram (Schematic Diagram)
for Sequential Control

JIS C 0401 —1982

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Circuit Diagram (Schematic Diagram)
for Sequential Control

C 0401-1982

1. Scope

This Japanese Industrial Standard specifies circuit diagrams of electric system for sequential control of installation equipment and apparatus in general industry.

- Remarks
1. This standard specifies electric systems of sequential control, but not the other parts, as a rule.
 2. For the time being, the sequential control for electric power installation is out of scope, however, if nothing interferes, it is preferable to comply with this standard.
 3. Sequence means order of occurrence of phenomena, and sequential control means a control system which advances each step of control successively in accordance with a predetermined order or an order determined by a certain logic.

Applicable Standards:

JIS C 0301-Graphical Symbols for Electrical Apparatus

JIS C 6271-Graphical Symbols for Binary Logic Elements

2. Definitions

For the purpose of this standard, the following definitions apply.

2.1 circuit diagram A diagram which represents the operations of installation, equipment and apparatus, irrespective of physical dimensions, shape and arrangement of each component, in such a way that the electrical connection is schematically expressed by means of graphical symbols leaded by their function.

2.2 items Items mean elements which form control system such as electrical machinery, apparatus, component, unit which appears in a circuit diagram.

2.2.1 item symbol A symbol to be given on an item by which identification of the item or discrimination of the same items can be done.

2.2.2 kind and function This term means the kind of item and the operation, character, purpose, etc. peculiar to the item.

2.2.3 location The location means the physical position of an item in the arrangement.

2.2.4 higher-level assignment When an item is included in a part of installation, equipment, apparatus, system, place, etc., such installation, equipment, apparatus, system, place, etc. are called as the higher-level assignment to the item.

2.2.5 qualifying symbols Symbols used to identify various designation blocks in an item symbol.

3. Object

The object of the circuit diagram is as follows:

- (1) To express the function of control system of installation, equipment and apparatus.
- (2) To supply the information for preparing an inner connection diagram and interconnection diagram of installation, equipment and apparatus.
- (3) To intend the convenience of test and maintenance of installation, equipment and apparatus.

4. Preparation

The preparation of circuit diagram shall be as follows:

4.1 General Principles

4.1.1 Size of Diagram As a rule, size of diagram shall be A 3. However, suitable diagram size may be selected from A series if necessary.

4.1.2 Compilation When a diagram is consisted of plural number of sheets, the sheets shall be numbered so that the mutual relevancy can be identified.

4.1.3 Arrangement The directions of connecting lines to connect the elements on the diagram shall, as a rule, be vertical and horizontal. The circuit diagram shall be classified into vertical writing and horizontal writing.

- (1) A circuit diagram wherein greater part of directions of lines connecting elements on the diagram is up and down direction is called as a vertically written circuit diagram.
- (2) A circuit diagram wherein greater part of directions of lines connecting elements on the diagram is right and left direction is called as a horizontally written circuit diagram.

The directions of arrangement of elements and lines connecting elements on a diagram, should preferably be the same as far as possible within the relevant diagrams of the same kind.

Moreover, the circuit should preferably be arranged so that the order of phenomena and flow of signals become clear, and this order should be arranged from left to right or from the upper part to the bottom part.

4.2 Application of Graphical Symbols The graphical symbols specified in JIS C 0301 and JIS C 6271 shall apply.

Remark: The display of graphical symbol for an element having 2 or more conditions such as make-and-break contact shall comply with the provisions specified in JIS C 0301.

4.3 Position of Displaying of Graphical Symbol When graphical symbols of the same item are displayed at separate locations on a diagram, the symbols shall be noted by an appropriate method to identify the locations each other. When the locations on a diagram are easily identified, whoever, such note may be omitted.

4.4 Designation of Item The items of equipment, apparatus and related apparatus shown in a circuit diagram shall be designated by the item symbols.

4.4.1 Arrangement and Designation of Item Symbol

- (1) Block of Item Symbol The item symbols are divided into the following four blocks:

Block 1 : higher-level assignment

Block 2 : Location

Block 3 : Kind and function

Block 4 : Terminal symbol

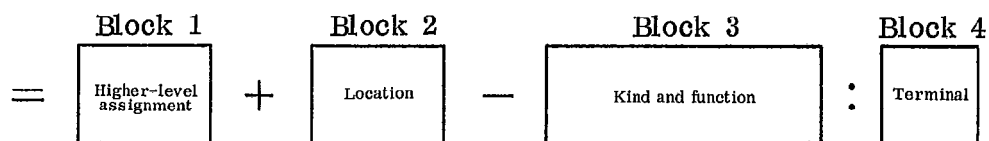
- (2) Qualifying Symbols Qualifying symbols are mainly used to distinguish various blocks, and the symbols shall be as follows:

= + - :

However, the qualifying symbol may be omitted or substituted by a note on a diagram. When the items appear in a table (e.g. connection table, parts list), the qualifying symbol may be omitted.

In the case of using qualifying symbols other than above-mentioned, an explanation shall be added.

- (3) Expression Method The item symbol shall be expressed by the use of qualifying symbols as follows:

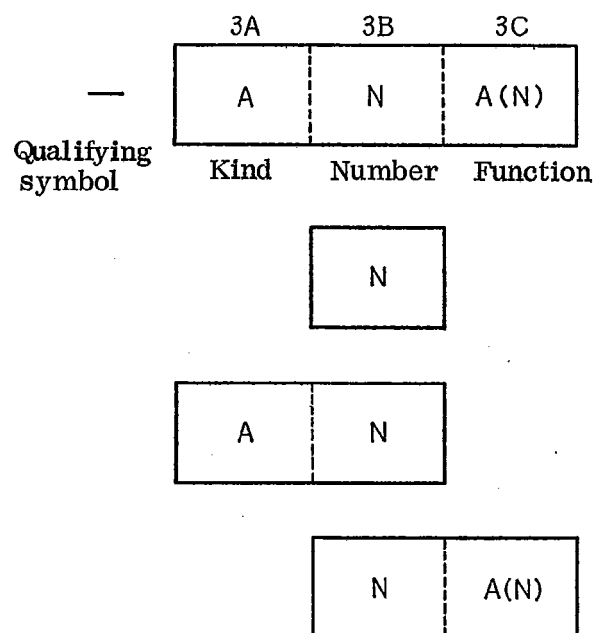


When there is little blank space on a diagram, or the item can be identified by a part of blocks forming the item symbol, the unnecessary block (s) in the above-mentioned expression method may be omitted.

The order of expression may be changed, but shall be in the same order in a series of diagrams. The code to be placed in each block shall be alphabet (A) and Arabic numerals (N).

Block 4 shall be added when special designation is required.

4.4.2 Designation of Kind and Function As a rule, this block consists of 3 parts (3 A, 3 B and 3 C). The part 3 B shall be displayed without fail, but part 3 A or 3 C or both of them are used for supplement, and may be combined as given below.



Part 3 A gives information about the kind of item, and consists of one or more letters. Table 1 indicates the letters to be used. In the case of using the other table, such fact shall be indicated on the diagram.

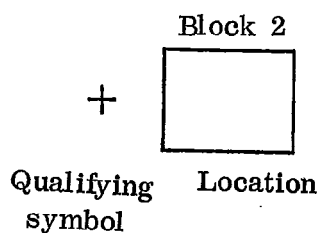
Part 3 B is such part that consists of numerals only by which the item is identified or numerals to discriminate plural number of items having the same letters in their parts 3 A and 3 C.

Part 3 C gives information about the function of item, and Table 2 indicates the letters to be used. In the case of using other table, such fact shall be indicated on the diagram.

The letter symbols specified in 4.4.7 may be used for block 3.

Also, in the case of using other tables by which the kind and function are identified clearly, such fact shall be indicated on the diagram.

4.4.3 Designation of Location

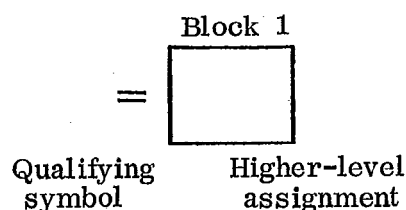


The object of designation of location is to find out physical location of the item quickly, and the location shall be designated by using consecutive numerals or letters indicating coordinates showing the physical location.

Generally, the designation shall be made by arranging the letters indicating coordinates and the numerals alternately, however, it may be made by numerals only.

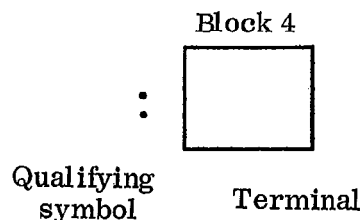
In the case of using other method to designate the location, such fact shall be additionally described.

4.4.4 Designation of Higher-Level Assignment



For designation of higher-level assignment, combination of numerals and letters is generally used.

4.4.5 Designation of Terminal Symbol



When indicating terminals of an item on a drawing, the terminals shall be displayed on the diagram with the qualifying symbol specified for block 4.

4.4.6 Examples of Designating Item

- (1) Example of a perfect item designation in which the higher-level assignment is used to indicate the item location in the complete plant:

= R 016 + 3 A 2 - Q 1 : 2

Terminal 2 (Block 4)
Of circuit breaker 1 (Block 3)
In subassembly A 2 within unit 3 (Block 2)
In room 016 (Block 1)

- (2) Example of an item designation in which the higher-level assignment is used to indicate the purpose of the item in the complete plant:

= 1 T 5 - M 3

Motor 3 (Block 3)
Pump 1 of cooling system for turbine 5 (Block 1)