
**Graphical symbols for diagrams —
Part 3:
Connections and related devices**

Symboles graphiques pour schémas —

Partie 3: Connexions et dispositifs associés

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 14617 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14617-3 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation and tpd-symbols*.

ISO 14617 consists of the following parts, under the general title *Graphical symbols for diagrams*:

- *Part 1: General information and indexes*
- *Part 2: Symbols having general application*
- *Part 3: Connections and related devices*
- *Part 4: Actuators and related devices*
- *Part 5: Measurement and control devices*
- *Part 6: Measurement and control functions*
- *Part 7: Basic mechanical components*
- *Part 8: Valves and dampers*
- *Part 9: Pumps, compressors and fans*
- *Part 10: Fluid power converters*
- *Part 11: Devices for heat transfer and heat engines*
- *Part 12: Devices for separating, purification and mixing*
- *Part 15: Installation diagrams and network maps*

Other parts are under preparation.

Introduction

The purpose of ISO 14617 in its final form is the creation of a library of harmonized graphical symbols for diagrams used in technical applications. This work has been, and will be, performed in close cooperation between ISO and IEC. The ultimate result is intended to be published as a standard common to ISO and IEC, which their technical committees responsible for specific application fields can use in preparing International Standards and manuals.

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Graphical symbols for diagrams —

Part 3: Connections and related devices

1 Scope

This part of ISO 14617 specifies graphical symbols for functional connections, mechanical links, pipelines and related devices such as connection joints, ISO ports, terminals, quick-release couplings and connectors, in diagrams.

For the fundamental rules of creation and application of graphical symbols in diagrams, see ISO 81714-1.

For an overview of ISO 14617, information on the creation and use of registration numbers for identifying graphical symbols used in diagrams, rules for the presentation and application of these symbols, and examples of their use and application, see ISO 14617-1.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 14617. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 14617 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 2553, *Welded, brazed and soldered joints — Symbolic representation on drawings*

ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers*

ISO 14617-1:2002, *Graphical symbols for diagrams — Part 1: General information and indexes*

ISO 81714-1:1999, *Design of graphical symbols for use in the technical documentation of products — Part 1: Basic rules*

3 Terms and definitions

For the purposes of this part of ISO 14617, the following terms and definitions apply.

NOTE 1 The list has been restricted to terms whose meaning is not obvious and which have not been defined elsewhere in an International Standard, or which have been defined in various ways in different standards. In preparing these definitions, ISO and IEC standards on terminology have been consulted; see the references in parentheses. However, most of the definitions in those standards were prepared by different technical committees within a restricted scope. This means that many terms so defined have to be given more general or neutral definitions when applied in the context of graphical symbols.

NOTE 2 In those cases where the same term has substantially different meanings in ISO and IEC, this is indicated beside the term by [ISO] or [IEC] and elsewhere in this part of ISO 14617 by a superscript, for example “port^{ISO}”.

3.1

connection

general term for functional connection, mechanical link, pipeline, electric conductor, etc.

3.2

functional connection

connection between functions

NOTE A functional connection is used to represent the interrelations between functions represented, for example, by symbols according to ISO 14617-6.

3.3

electric connection

conductor or circuit for joining terminals or other conductors

[IEC 60050-151, IEC 60050-531, IEC 60050-581]

3.4

connection [ISO]

threaded port, flange, or similar means for connecting a pipeline to a component

[ISO 5598]

c.f. port (3.13) and terminal.

3.5

internal connection

connection in the form of one or more pipelines or conductors that is an integral part of a component

NOTE An internal connection need not be located inside a component.

3.6

line [ISO]

abbreviation of the term “pipeline”

3.7

line [IEC]

multi-pole or multi-phase electric connection

EXAMPLE Power line, telecommunication line, transmission line.

3.8

cable

insulated conductor or several insulated conductors with a common covering

3.9

pipe unit

pipeline or, more often, several pipelines in a common covering pipe with insulation

3.10

information bus

bus with conductors conveying information

3.11

unidirectional

having the property to move, transmit, etc. in one direction only

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3.12**bidirectional**

having the property to move, transmit, etc. in two alternative, opposite directions

[ISO 5598]

3.13**port** [ISO]

terminus of a fluid passage in a component to which can be connected pipelines for the transmission of fluid to or from the component

[ISO 5598]

cf. connection (3.4) and terminal.

3.14**connector**

component which terminates conductors, flexible pipes, or hoses in order to provide connection and disconnection to a mating component

[IEC 60050-441, IEC 60050-581]

cf. connector pair (3.16).

3.15**quick-release coupling**

connection (3.4) which may be joined or separated without the use of tools

[ISO 5598]

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3.16**connector pair**

combination of mating connectors

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[IEC 60050-581]

3.17**bundle**

group of conductors or pipelines that mainly follow the same path

NOTE The bundle may be a real (product) bundle or a line on a diagram representing a number of conductors or pipelines (single-line representation) even if these do not form a real bundle.

3.18**single-line representation**

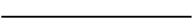
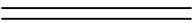
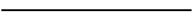


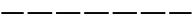

representation where two or more connections or components are represented by a single symbol

[IEC 61082-1]

4 Connections

4.1 Symbols of a basic nature

NOTE For the application of the symbols, see R401 (4.2.1) and R402 (4.2.2).

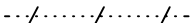
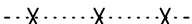
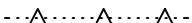
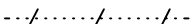
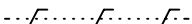
4.1.1	401		Functional connection
4.1.2	402	Form 1 	Mechanical link, shaft
4.1.3	403	Form 2 	Mechanical link, shaft, wire
4.1.4	404		Electrically insulating mechanical link, shaft, wire See R403 (4.2.3).
4.1.5	405		Pipeline, duct
4.1.6	406		Group of pipelines, ducts in single-line representation
4.1.7	411		Non-guided electromagnetic beam
4.1.8	412		Planned pipeline, duct
4.1.9	413		Group of planned pipelines, ducts in single-line representation
4.1.10	422		Pilot (control), drain, purge, or bleed line in fluid power systems

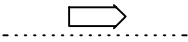





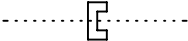

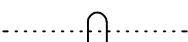

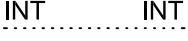
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4.2 Application rules for the symbols in 4.1

4.2.1	R401	Symbols for connections may cross each other. For an example, see X401 (4.5.1).
4.2.2	R402	When confusion between symbols 401 (4.1.1) and 405 (4.1.5) or 406 (4.1.6) is likely, symbols giving supplementary information according to clause 4.3 shall be used. For an example, see X401 (4.5.1).
4.2.3	R403	In simplified representation, the symbol may also represent any type of linkage system between an actuator and the affected item, for example, a combination of mechanical links and hydraulic pipelines. For an example, see X405 (4.5.5).

4.3 Symbols giving supplementary information

4.3.1	431		Pure functional type
4.3.2	432		Capillary type
4.3.3	433		Pneumatic type
4.3.4	434		Hydraulic type
4.3.5	435		Electric type

4.3.6	442		Unidirectional information bus type
4.3.7	443		Bidirectional information bus type
4.3.8	444	Form 1 	Flexible type For form 1, see R412 (4.4.1).
4.3.9	452	Form 2 	
4.3.10	445		Circular shape
4.3.11	446		Rectangular shape
4.3.12	447		Ridged shape
4.3.13	448		Twisted pipeline or duct
4.3.14	449		Cable, pipe unit See R412 (4.4.1).
4.3.15	450		Twisting of pipelines See R412 (4.4.1).
4.3.16	451	INT INT 	Internal connection See R413 (4.4.2).

4.4 Application rules for the symbols in 4.3

4.4.1	R412	The symbol may instead be located beside the line or lines, provided with a leader line terminated by an arrowhead. For examples, see X411 (4.5.11) to X413 (4.5.13), X421 (4.5.14) and X422 (4.5.15).
4.4.2	R413	<p>The symbol shall be used when it is necessary to indicate that a certain connection is internal, i.e. an integral part of the component or device represented. The symbol shall be placed at both ends of the internal connection or, with a short connecting line, between the two ends.</p> <p>If the internal connection is also connected to a terminal or port^{ISO}, the symbol may be omitted, provided that the terminal or port^{ISO} is represented by symbol 561 (8.1.1) or indicated by a terminal designation.</p> <p>In diagrams for fluid power systems, an internal connection may instead be indicated by bending at least one of the ends of the connecting line by 45° to 60°. For an example, see X435 (4.5.18).</p>