
Graphical symbols for diagrams —
Part 15:
Installation diagrams and network maps

Symboles graphiques pour schémas —

Partie 15: Schémas d'installation et cartes de réseau

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Printed in Switzerland

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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 14617-15 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 15: Installation diagrams and network maps

1 Scope

This part of ISO 14617 specifies graphical symbols for use on installation diagrams (e.g. for buildings) and network maps, supplementing the symbols specified in ISO 14617-2 to ISO 14617-12. Symbols on such diagrams are used mainly to indicate the location and type of a component or device.

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 31 (all parts), *Quantities and units*

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

ISO 14617-2:2002, *Graphical symbols for diagrams — Part 2: Symbols having general application*

IEC 60027 (all parts), *Letter symbols to be used in electrical technology*

3 Terms and definitions

For the purposes of this part of ISO 14617, the terms and definitions given in ISO 14617-1 and the following apply.

NOTE 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.

3.1 installation diagram

drawing showing the location of the components of an installation and their interconnections by means of graphical symbols

[IEC 61082-1]

3.2 network map

overview diagram showing a network on a map

EXAMPLE Diagram showing generating and transforming stations and power lines, telecommunication equipment and transmission lines.

NOTE The term also applies to distribution and transmission pipelines for oil, natural gas, district heating and district cooling, potable water and sewage systems.

[IEC 61082-1]

3.3 potable water

water suitable for human consumption and conforming with relevant regulation

3.4 protection unit

⟨potable water systems⟩ backflow unit for protecting the quality of potable water

3.5 sensor

primary element of a measuring chain which converts the input variable into a signal suitable for measurement

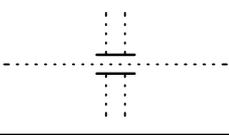
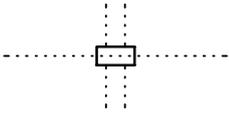
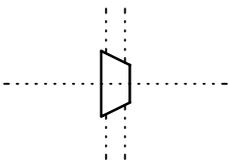
[ISO 5598, IEC 60050-351]

3.6 detector

device which accepts information in the form of a physical or chemical variable and transmits a binary signal at a specified condition

4 Installation of pipelines and ducts

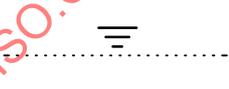
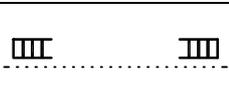
4.1 Symbols of a basic nature

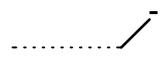
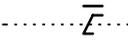
4.1.1	3001		Sleeve for penetration of construction such as a wall; wall duct
4.1.2	3002		Seal for penetration of construction such as wall; sealed wall duct See R3001 (4.2.1).
4.1.3	3003		Seal for penetration of construction partitioning a space with different air pressure NOTE The long side corresponds to the higher pressure.
4.1.4	3004		Anchor point
4.1.5	3005		Guide bracket, for example, for pipelines

4.2 Application rule for the symbols in 4.1

4.2.1	R3001	The symbol may be supplemented with the abbreviations AT for air-tight, WT for water-tight and FR for fire-resistant.
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4.3 Symbols giving supplementary information

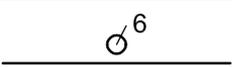
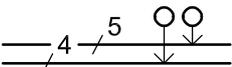
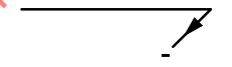
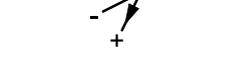
4.3.1	3051		Located underground EXAMPLE Pipeline, cable or joint.
4.3.2	3052		Located underwater EXAMPLE Pipeline or cable.
4.3.3	3053		Located on poles EXAMPLE Pipeline, cable or power line.
4.3.4	3054		Located in a circular duct or pipe EXAMPLE Conductor or cable.
4.3.5	3055		Located in a rectangular duct EXAMPLE Pipeline, conductor or cable.
4.3.6	3056		Located on a tray — endpoints indicated. EXAMPLE Pipeline, conductor or cable.

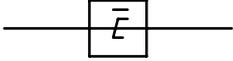
4.3.7	3057		Located on a tray — continuous EXAMPLE Pipeline, conductor or cable.
4.3.8	3058		Going to a storey above EXAMPLE Pipeline, cable or conductor bundle The bending point indicates the location where a pipeline, cable or conductor bundle, for example, changes direction. The direction of the symbol has no meaning. See R3051 (4.4.1) and R3053 (4.4.3).
4.3.9	3059		Going to a storey below EXAMPLE Pipeline, cable or conductor bundle. The bending point indicates the location where a pipeline, cable or conductor bundle, for example, changes direction. The direction of the symbol has no meaning. See R3051 (4.4.1) and R3053 (4.4.3).
4.3.10	3060		Going between a storey above and a storey below EXAMPLE Pipeline, cable or conductor bundle The bending point indicates the location of, for example, a pipeline, cable or conductor bundle. The direction of the symbol has no meaning. See R3052 (4.4.2) and R3053 (4.4.3).
4.3.11	3061		Slope of, for example, a pipeline See R3054 (4.4.4).
4.3.12	3062	INF	Information
4.3.13	3063		Blocking of electric current
4.3.14	3064	S	Sound
4.3.15	3065	CNTL	Control
4.3.16	3066	AL	Alarm
4.3.17	3067	AL/L	Light alarm
4.3.18	3068	AL/S	Sound (acoustic) alarm
4.3.19	3069	AL/V	Vibrating (tactile) alarm

4.4 Application rules for the symbols in 4.3

4.4.1	R3051	The angle between the symbol and the symbol, for example, for a pipeline, cable or conductor bundle shall be between 30° and 150°.
4.4.2	R3052	The angle between the two lines of the symbol shall be between 30° and 45°.
4.4.3	R3053	The direction of flow may be indicated. For examples, see X3004 (4.5.4) to X3009 (4.5.9).
4.4.4	R3054	The symbol shall be oriented such that it indicates the direction of the slope. The slope may be indicated (e.g. 1% or 1:100). For an example, see X3010 (4.5.10).

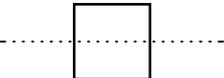
4.5 Application examples

4.5.1	X3001	 501, 3051	Underground joint of pipeline or cable
4.5.2	X3002	 344, 3054	Pipeline or conductor within a six-pipe duct
4.5.3	X3003	 344, 3054	Four pipelines or conductors in a pipe and five pipelines or conductors in another
4.5.4	X3004	 242, 3058	Pipeline going to a storey above — direction of flow upwards Two possibilities shown.
4.5.5	X3005	 242, 3058	
4.5.6	X3006	 342, 3059	Pipeline going to a lower level — direction of flow downwards Two possibilities shown.
4.5.7	X3007	 342, 3059	
4.5.8	X3008	 242, 3060	Pipeline to a storey above coming from a storey below — direction of flow upwards Two possibilities shown.
4.5.9	X3009	 242, 3060	

4.5.10	X3010	 3061	Pipeline with 5 % slope to the left
4.5.11	X3011	 101, 3063	Device for blocking electric current in a pipeline

5 Connection boxes, access chambers, inspection wells, distribution centres

5.1 Symbol of a basic nature

5.1.1	3081		Connection box, junction box
5.1.2	3082		Consumer's terminal, service entrance equipment
5.1.3	3083		Distribution centre
5.1.4	3084		Enclosure See R3081, (5.2.1).
5.1.5	3085		Cross-connection device
5.1.6	3086		Square-shaped access chamber, inspection well
5.1.7	3087		Circular-shaped access chamber, inspection well

5.2 Application rule for the symbols in 5.1

5.2.1	R3081 Qualifying symbols or annotations may be used to indicate the equipment contained.
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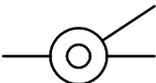
5.3 Symbol giving supplementary information

None.

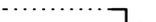
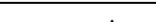
5.4 Application rule for the symbol in 5.3

None.

5.5 Application examples

5.5.1	X3081	 301, 891	Enclosure with amplifying equipment
5.5.2	X3082	 3085	Cross-connection point with three pipelines, power or telecommunication lines

6 Water taps and related devices

6.1	3101		Outlet tap
6.2	3102		Outlet tap in taphole
6.3	3103		Outlet tap on wall
6.4	3104		Mixing outlet tap
6.5	3105		Mixing outlet tap in taphole
6.6	3106		Mixing outlet tap on wall
6.7	3107		Self-closing outlet tap
6.8	3108		Hand-held shower
6.9	3109		Flushing valve with pipe interrupter

7 Hydrants and related devices

7.1	3121		Underground hydrant
7.2	3122		Above-ground hydrant
7.3	3123		Wall hydrant
7.4	3124		First-aid fire-hose reel

8 Devices for measurement, control and protection

8.1 Symbols of a basic nature

8.1.1	752		Sensor See R3131 (8.2.1).
8.1.2	3132		Detector, pilot switch See R712 (8.2.2).
8.1.3	3133		Electric window foil
8.1.4	3134		Protection unit for potable water systems See R3132 (8.2.3).

8.2 Application rules for the symbols in 8.1

8.2.1	R3131	The asterisk shall be replaced with a letter symbol in accordance with ISO 31 or IEC 60027, by a graphical symbol for the quantity being measured, or shall be omitted.
8.2.2	R712	The asterisk shall be replaced with the symbol in accordance with ISO 14617-2:2002, 4.3.4.
8.2.3	R3132	The asterisk shall be replaced with a letter code, explained in the diagram or in a supporting document.

8.3 Symbols giving supplementary information

8.3.1	3141		Sound
8.3.2	3142		Fire
8.3.3	3143		Smoke
8.3.4	3144		Dust
8.3.5	3831		Vibration

8.4 Application rule for the symbols in 8.3

None.

8.5 Application examples

8.5.1	X3131	 752	Heat (temperature) sensor
8.5.2	X3132	 3132	Heat (temperature) detector
8.5.3	X3133	 3132, 3141	Sound detector
8.5.4	X3134	 3132, CEI	Light detector
8.5.5	X3135	 3132, 3142	Fire detector
8.5.6	X3136	 3132, 3143	Smoke detector
8.5.7	X3137	 3132, 3144	Dust detector
8.5.8	X3138	 245, 3132	Motion detector
8.5.9	X3139	 241, 261, 3132	Passage detector
8.5.10	X3140	 171, 3132	Detector for pressure higher than the setting value
8.5.11	X3141	 3132	Detector for pressure changes (burglar detector)
8.5.12	X3142	 3132, 3831	Vibration detector
8.5.13	X3143	 3132, 3831	Vibration detector for vertical vibrations
8.5.14	X3144	 3051, 3132, 3831	Earthquake detector

9 Water heaters, air conditioners

9.1 Symbol of a basic nature

9.1.1	101		Complex device, functional unit, plant, function See R101 (ISO 14617-2:2002, 4.2.1).
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9.2 Application rule for the symbol in 9.1

See ISO 14617-2:2002, 4.2.1.

9.3 Symbols giving supplementary information

9.3.1	2541		Fired type
9.3.2	3151	A/C	Air conditioning

9.4 Application rule for the symbols in 9.3

None.

9.5 Application examples

9.5.1	X3151	 2061, 2541	Stove or water heater of fired type
9.5.2	X3152	 101, 3151	Air conditioner

10 Technical plants and systems

10.1 Symbol of a basic nature

10.1.1	101		Complex device, functional unit, plant, function See R101 (ISO 14617-2:2002, 4.2.1).
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10.2 Application rule for the symbol in 10.1

See ISO 14617-2:2002, 4.2.1.

10.3 Symbols giving supplementary information

10.3.1	130	* ↑	Transition to a higher quantity level
10.3.2	131	* ↓	Transition to a lower quantity level
10.3.3	241	→	Direction of mass flow
10.3.4	321	~	Liquid
10.3.5	2038	⌋	Siphon, anti-siphon trap
10.3.6	2061	└┘	Container, tank, cistern for atmospheric pressure
10.3.7	2301	⊙	Liquid pump
10.3.8	2501	↗	Heat exchanger type
10.3.9	2541	△	Fired type
10.3.10	3201	θ ↑	Heat pump type — temperature increase
10.3.11	3202	θ ↓	Heat pump type — temperature decrease
10.3.12	3203	E	Electric type
10.3.13	3204	SW	Sewage water
10.3.14	3205	NaCl	Salt
10.3.15	3206	~	Pond
10.3.16	3207	◇	Waste

10.4 Application rule for the symbols in 10.3

None.

10.5 Application examples

10.5.1	X3201		Hot water generating plant
		101, 2501	
10.5.2	X3202		Hot water generating plant — fired type
		101, 2541, 2501	