INTERNATIONAL STANDARD

ISO 14617-7

First edition
2002-09-01

Graphical symbols for diagrams —

Part 7: Basic mechanical components

Symbols graphiques pour schémas —

Partie 7: Éléments mécaniques de base

Reference number
ISO 14617-7:2002(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

Page

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 14617-7 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.

Graphical symbols for diagrams —

Part 7:
Basic mechanical components

1 Scope

This part of ISO 14617 specifies graphical symbols in diagrams for

— mechanical elements such as weights, springs, clutches and brakes,

— pipe and duct elements such as restrictors, nozzles and air vents, and

— devices for storage such as tanks, pressure vessels and gas bottles.

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

ISO 14617-4:2002, *Graphical symbols for diagrams — Part 4: Actuators and related devices*

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 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
orifice plate
flow sensor element producing a differential pressure by means of a plate with a specified hole

[IEC 60050-351]

3.2
flow nozzle
flow sensor element producing a differential pressure by means of a convergent device being inserted in a fluid flow

[IEC 60050-351]

3.3
critical flow nozzle
nozzle of which the geometrical configuration is such that the flow rate remains constant irrespective of the fluid condition downstream of the nozzle

[IEC 60050-351]

3.4
venturi element
flow sensor element producing a differential pressure by means of a profiled tube generating a change in the velocity of the fluid flowing through it

[IEC 60050-351]

NOTE The tube consists of a cylindrical entrance part, a convergent part, a cylindrical throat and a divergent part.

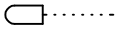
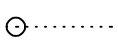
3.5
pitot tube
flow sensor element producing a differential pressure by means of two straight tubes mounted in line with the direction of the fluid movement

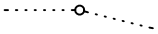
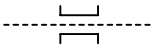
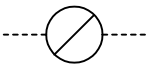
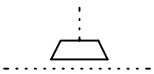
[IEC 60050-351]

NOTE The two tubes may be mounted coaxially as a unit.

4 Mechanical elements

4.1 Symbols of a basic nature

4.1.1	**711**		Plunger; tracer
4.1.2	**712**		Roller
4.1.3	**713**		Cam profile See R711 (4.2.1).
4.1.4	**715**		Fluid-level-operated actuator, for example, in the form of a float

4.1.5	**716**		Flow-target-operated actuator, for example, in the form of a mechanical flag
4.1.6	**771**		Displacer
4.1.7	**2001**		Weight
4.1.8	**2002**		Spring See R2001 (4.2.2).
4.1.9	**2003**	Form 1	Membrane; diaphragm
4.1.10	**2004**	Form 2	
4.1.11	**2005**		Joint of two mechanical parts permitting motion of the parts in two or more dimensions EXAMPLE Cardan joint.
4.1.12	**2006**		Bearing
4.1.13	**2007**		Buffer head
4.1.14	**2008**		Mechanical gear pair
4.1.15	**2009**		Clutch, disengaged in unactuated state
4.1.16	**2010**		Clutch, engaged in unactuated state
4.1.17	**2011**		Brake, disengaged in unactuated state
4.1.18	**2012**		Brake, applied in unactuated state
4.1.19	**2013**		Wheel See R2002 (4.2.3).
4.1.20	**2014**	Form 1 	Ball
4.1.21	**2015**	Form 2 	

4.2 Application rules for the symbols in 4.1

4.2.1	**R711**	The shape of the symbol shall correspond to that of the cam itself. For an example, see X711 (4-6.5.1). A cam of circular form may be shown developed as in the symbol shown.
4.2.2	**R2001**	The symbol may be used for springs that are used for the following. a) To exert a counter-force, for example, in spring-loaded safety valves. For an example, see X2002 (4.5.2). b) To perform an automatic return function, for example, in directional control valves. The symbol shall be located and interpreted as stated in R653 (4-4.2.3). For an example, see X2003 (4.5.3), in which the left-hand/right-hand spring symbol indicates automatic return to the right/left. The use of the symbol to indicate automatic return shall be confined to applications on symbols for valves for fluid power. c) To store energy, for example, in quick-acting valves and in actuating devices for circuit-breakers. For examples, see X2004 (4.5.4) and X2005 (4.5.5). d) To perform a function combining a) to c). For an example, see X2006 (4.5.6).
4.2.3	**R2002**	The indication of the centre may be omitted if confusion is unlikely.

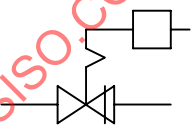
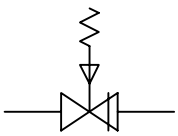
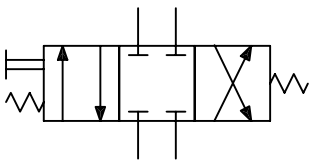
4.3 Symbol giving supplementary information

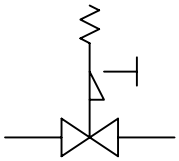
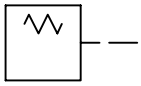
None.

4.4 Application rule for the symbol in 4.3

None.

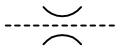
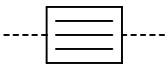
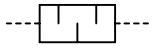
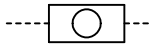
4.5 Application examples

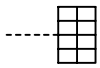
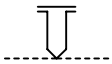
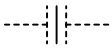
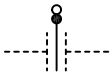
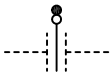
4.5.1	**X2001**	 403, 655, 2001, 2101, 2112	Weight-loaded safety valve detained in open position after operation
4.5.2	**X2002**	 403, 654, 2002, 2101, 2112	Spring-loaded safety valve with automatic return after operation [Use symbol 2002 (4.1.8) to indicate a counter-force.]
4.5.3	**X2003**	 242, 402, 681, 2002, 2161, 2171, 2172	Directional control valve with four ports and three distinct positions, automatic return to mid-position [Use symbol 2002 (4.1.8) to indicate spring return.]

4.5.4	**X2004**	 403, 661, 681, 2002, 2101	Quick-acting valve, closing when spring is released [Use symbol 2002 (4.1.8) to indicate storing of energy.]
4.5.5	**X2005**	 404, 741, 2002	Spring-loaded actuating device, for example, for a circuit-breaker [Use symbol 2002 (4.1.8) to indicate storing of energy.]
4.5.6	**X2006**	 2002, 2007	Spring-equipped buffer [Use symbol 2002 (4.1.8) to indicate an automatic return, a counter-force, and storing of energy.]
4.5.7	**X2007**	 301, 2007	Hydraulic buffer

5 Pipe and duct elements

5.1 Symbols of a basic nature

5.1.1	**2031**		Restrictor
5.1.2	**772**		Orifice plate
5.1.3	**773**		Flow nozzle
5.1.4	**774**		Critical flow nozzle
5.1.5	**775**		Venturi element
5.1.6	**2032**		Flow straightener
5.1.7	**2033**		Silencer
5.1.8	**2034**		Viewing glass
5.1.9	**2035**		Rupturing disc

5.1.10	**2036**		Flame arrestor
5.1.11	**2037**		Spray nozzle
5.1.12	**2038**		Siphon, anti-siphon trap
5.1.13	**2039**		Vent
5.1.14	**2040**		Drain funnel
5.1.15	**2041**		Stack
5.1.16	**2042**		Pig receiver; launcher
5.1.17	**2043**		Blind
5.1.18	**2044**		Spectacle blind, shown in closed position
5.1.19	**2045**		Spectacle blind, shown in open position

5.2 Application rules for the symbols in 5.1

None.

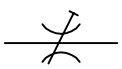
5.3 Symbol giving supplementary information

None.

5.4 Application rule for the symbol in 5.3

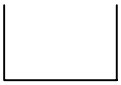
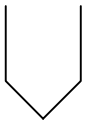
None.

5.5 Application example

5.5.1	**X2031**	 203, 2031, 2171	Restriction with pre-set adjustability

6 Devices for storage

6.1 Symbols of a basic nature

6.1.1	**2061**		Container, tank, cistern for atmospheric pressure See R2061 (6.2.1).
6.1.2	**2062**	Form 1 	Pressure or vacuum vessel See R2061 (6.2.1).
6.1.3	**2063**	Form 2 	
6.1.4	**2064**		Bunker See R2061 (6.2.1).
6.1.5	**2065**		Open store
6.1.6	**2066**		Shelf store
6.1.7	**2067**		Barrel
6.1.8	**2068**		Bag

6.2 Application rule for the symbols in 6.1

6.2.1	**R2061**	The symbol may have another shape if the shape of the tank is significant for the function.

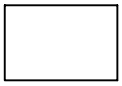
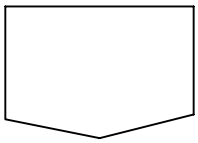
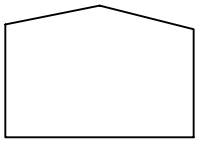
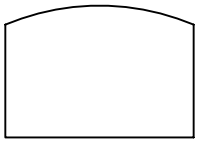
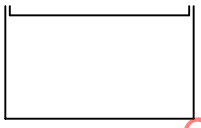
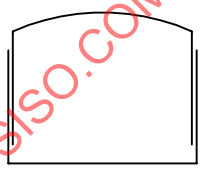
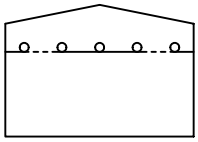
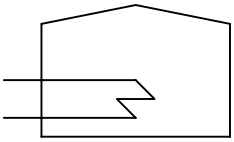
6.3 Symbol giving supplementary information

None.

6.4 Application rule for the symbol in 6.3

None.

6.5 Application examples

6.5.1	**X2061**	 2061	Closed tank for atmospheric pressure
6.5.2	**X2062**	 2061	Closed tank with conic bottom
6.5.3	**X2063**	 2061	Tank with conic roof
6.5.4	**X2064**	 2061/2062	Tank with torispheric roof
6.5.5	**X2065**	 2061	Tank with floating roof
6.5.6	**X2066**	 2062	Gas-holder
6.5.7	**X2067**	 2015, 2061	Tank with conic roof and surface of liquid provided with floating balls
6.5.8	**X2068**	 2061, 2501	Tank with conic roof and provided with internal heating or cooling coil