INTERNATIONAL STANDARD

ISO 14617-1

Second edition
2005-07-15

Graphical symbols for diagrams —

Part 1: General information and indexes

Symboles graphiques pour schémas —

Partie 1: Informations générales et index

Reference number
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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 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14617-1 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation and tpd-symbols*.

This second edition cancels and replaces the first edition (ISO 14617-1:2002), of which it constitutes a minor revision.

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 13: Devices for material processing*

— *Part 14: Devices for transport and handling of material*

— *Part 15: Installation diagrams and network maps*

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 1:
General information and indexes

1 Scope

This part of ISO 14617 serves as an introduction to all the other parts. In particular, it gives 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. It includes three indexes: an alphabetical index and an index of registration numbers — both concerned uniquely with ISO 14617 — and an index of cross-references to related items found in other International Standards.

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

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 document, 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
function
activity proper to anything, mode of action by which it fulfils its purpose

EXAMPLE To measure, to control, to indicate.

3.2
product
thing produced by natural process or manufacture; result

EXAMPLE An element, a component or a device.

3.3
component
constituent part of equipment that cannot be physically divided into smaller parts without losing its character

[IEC 60050-131]

3.4
device
assembly of components to perform a required function

EXAMPLE An actuating device, a centrifuge.

[IEC 60050-151]

3.5
element
part of a component

EXAMPLE A filter element in a filter, a contact in an electromechanical relay.

3.6
graphical symbol
visually perceptible figure used to transmit information independently of language

[ISO 81714-1]

3.7
terminal line
line of a graphical symbol ending at a connect node

NOTE A connect node is a location on a graphical symbol intended for connection (ISO 81714-1).

[ISO 81714-1]

3.8
connecting line
graphical symbol representing a functional connection, a mechanical link, a pipeline, a duct, or an electric connection

[IEC 61082-1]

4 Arrangement of ISO 14617

4.1 Domains of application

The complete ISO 14617 is to consist of a number of other parts in addition to those listed in the Foreword. Among the parts under preparation are ISO 14617-13, concerned with graphical symbols for material processing, and ISO 14617-14, concerned with the symbols representing devices for transport and handling of material.

This part of ISO 14617 is an introduction to all the other parts. ISO 14617-2 to ISO 14617-6 cover graphical symbols for use in most technical fields. ISO 14617-7 to ISO 14617-12 cover those for use in all fields except the electrotechnical. ISO 14617-15 comprises graphical symbols for use in installation diagrams and on network maps for pipelines, ducts and electric connections.

4.2 Subdivision of parts

Each part of ISO 14617 is divided into clauses that each deal with graphical symbols for a particular group of generic products or functions. When appropriate, clauses are given subclauses, as follows using the example of Clause 7 from ISO 14617-2:

Clause 7	Directions
Subclause 7.1	Symbols of basic nature
Subclause 7.2	Application rules for the symbols in 7.1
Subclause 7.3	Symbols giving supplementary information
Subclause 7.4	Application rules for the symbols in 7.3
Subclause 7.5	Application examples

Where certain subclauses are further subdivided, this has been done along the following lines. Take, for example, 4.3 in ISO 14617-2:

Subclause 4.3	Symbols giving supplementary information
Subclause 4.3.1	Input and output labels
Subclause 4.3.2	General functions
Subclause 4.3.3	Mathematical operations
Subclause 4.3.4	Change of discrete state at specified values of a characteristic quantity
Subclause 4.3.5	Logic negation, logic inversion, inputs and outputs for auxiliary power supply

When a cross-reference is made to a particular graphical symbol or application rule or application example, its location is given within parentheses after the registration number of the symbol, rule or example.

EXAMPLE 1 “See R101 (4.2.1)” directs the reader to application rule R101, located in subclause 4.2.1.

When cross-referencing to another part, the part number is also included.

EXAMPLE 2 A cross-reference to symbol 142 in ISO 14617-2 is given as “See 142 (2-4.3.2.28)”.

5 Registration numbers

IMPORTANT — A direct relationship does not necessarily exist between graphical symbols, application rules and application examples using registration numbers that share the same numerals. For example, while graphical symbol 101 correlates to both application rule R101 and application example X101, it correlates as well to application examples X102 to X114; whereas symbol 114, to take just one other example, is unrelated to R114 and X114.

5.1 Graphical symbol

Each graphical symbol is assigned a unique registration number. In principle, this number is arbitrarily chosen. No information can be derived from it. The registration number will remain unchanged throughout the lifetime of the corresponding graphical symbol, including in future revisions of this publication. If a graphical symbol is changed in the future, the registration number shall be supplemented with one or more characters. If the graphical symbol is substantially changed, it shall instead be given a new registration number.

5.2 Application rule

Each application rule has a registration number in the same way as the graphical symbols, except that the registration number starts with the letter R (e.g. R101).

5.3 Application example

Each application example has a registration number in the same way as the graphical symbols, except that the registration number starts with the letter X (e.g. X101).

6 Presentation of graphical symbols

6.1 General

ISO 14617 establishes graphical symbols to be used in diagrams such as overview diagrams, flow diagrams and circuit diagrams.

6.2 Graphical symbols of same shape but different meaning

Graphical symbols having the same shape but different meanings have different registration numbers. This implies that it is possible to distinguish between same-shape graphical symbols in a CAD (computer-aided design) system, provided that each symbol has been recalled from a CAD library using the appropriate registration number.

For a person reading a diagram, the intended meaning can normally be recognized by the context of the diagram. When this is not possible, graphical symbols having the same shape shall be provided with supplementary information. For examples, see the symbols for connections in ISO 14617-3 and the rules for adding symbols giving supplementary information such as application rule R402 in the same part.

6.3 Different forms of graphical symbols

In some cases, different forms of a graphical symbol can occur. These different forms are given separate registration numbers. The primary reason for having two or more forms for the same symbolization is that they convey differing amounts of information.

Symbols having different forms and differing amounts of information (e.g. those for use in overview diagrams and those for use in circuit diagrams) are marked Form 1, Form 2, etc. This marking is also used in some cases where the different forms contain the same amount of information, but where more than one form is justified because of different application methods in the rules for preparing diagrams.

6.4 Dimensions of graphical symbols

The graphical symbols in ISO 14617 have been designed in accordance with the rules given in ISO 81714-1. The module size M = 2,5 mm has been used. For small graphical symbols, the symbol is shown double its normal size, applying the same module and the same line width. Such symbols are marked “200 %”.

For the auxiliary grid system defined in ISO 81714-1, the module 0,25 M has been used.

6.5 Descriptions

In those cases where ISO and IEC have the same term for different items, the term has been provided with ISO and IEC superscripts, for example, line^{ISO} and line^{IEC}.

7 Application rules and examples

The application rules give information on how to design composite symbols and how to apply the graphical symbols in a diagram. The application examples are to be regarded as guidelines.

In order to facilitate their use, the application examples are accompanied by information on which graphical symbols have been used to compose the examples shown.

EXAMPLE "101, 123" in 2-4.5.8 signifies that the example X108 is built up from graphical symbols 101 and 123.

8 Use of graphical symbols

8.1 Choice of graphical symbols

Rules for the choice of graphical symbols are given in the standards for the preparation of diagrams.

8.2 Dimensions of graphical symbols

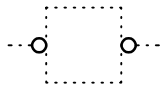
Symbols may be increased in size, for example, in order to allow all terminals to be represented. They may also be reduced in size. In both cases, the original line width shall be maintained.

Further rules for the use of graphical symbol sizes and line widths are given in the standards dealing with the preparation of diagrams.

8.3 Auxiliary lines

In some cases, the symbol has been shown together with auxiliary lines in order to indicate its correct location in relation to other symbols or the recommended location of connecting lines. Such auxiliary lines are not part of the symbol and are shown dotted (very short dashes).

EXAMPLE 1 Symbol 181 — logic negation — shown at an outline of a symbol indicated by a dotted rectangle.



EXAMPLE 2 An auxiliary line indicating the correct location of the symbol for a connection to a two-way valve, symbol 2101.

8.4 Variants of graphical symbols

The rules for diagram layout give the possibility of arranging circuits horizontally or vertically, and of arranging circuits for feedback and similar signals in a direction opposite to the normal one. For that purpose, different variants of the graphical symbols exist. The rules for the creation of the different variants are given in ISO 81714-1.

9 Lettering

For lettering, see ISO 81714-1.

10 Indexes

The alphabetic index given in Annex A can be used to find a graphical symbol for a certain component, device or function wherever the meaning (description) is known. This index also covers the application examples.

The registration number index given in Annex B can be used to locate a graphical symbol whose registration number is already known.

The cross-reference index given in Annex C is intended as a link between the registration numbers and the corresponding descriptions in other, existing ISO and IEC standards.

Annex A
(informative)

Alphabetical index

This alphabetical index can be used to find a graphical symbol for a certain component, device, or function if its meaning (description) is already known. The index also covers the application examples.

17

Annex B
(informative)

Index of graphical symbol registration numbers

This registration number index may be used to find a graphical symbol whose registration number is known.

Registration number	Location (Part-subclause)	Description
101	2-4.1.1	Complex device, functional unit, equipment, plant, function
	13-4.1.1	Complex device, functional unit, equipment
	15-9.1.1	Complex device, functional unit, plant, function
	15-10.1.1	Complex device, functional unit, plant, function
106	2-4.3.1.1	Label (Input or output label)
107	2-4.3.1.2	Label grouping
111	2-4.3.2.1	Conversion
112	2-4.3.2.2	Conversion
113	2-4.3.2.3	Conversion without connection between input and output circuits
114	2-4.3.2.4	Conversion without connection between input and output circuits
115	2-4.3.2.5	Amplification
	6-7.3.3.1	
119	2-4.3.2.6	Magnetic field effect
121	2-4.3.2.7	Proximity effect
122	2-4.3.2.8	Touch effect
123	2-4.3.2.9	Delay
	6-7.3.3.2	
124	2-4.3.2.10	Hysteresis
	6-7.3.3.3	
125	2-4.3.2.11	Stabilizing
126	2-4.3.2.12	Enabling input
127	2-4.3.2.13	Compensating input
128	2-4.3.2.14	Compensated output
129	2-4.3.2.15	Postponed output
130	2-4.3.2.16	Transition to a higher quantity level
	11-8.3.1	
	15-10.3.1	
131	2-4.3.2.17	Transition to a lower quantity level
	11-8.3.2	
	15-10.3.2	
132	2-4.3.2.18	Transition to a higher or lower quantity level
	11-8.3.3	
133	2-4.3.2.19	High limitation
	5-12.3.1	
	6-7.3.3.4	
134	2-4.3.2.20	High limitation
	5-12.3.2	
	6-7.3.3.5	
135	2-4.3.2.21	Low limitation
	5-12.3.3	
	6-7.3.3.6	
136	2-4.3.2.22	Low limitation
	5-12.3.4	
	6-7.3.3.7	
137	2-4.3.2.23	Dead band; threshold
	5-12.3.5	
	6-7.3.3.8	
138	2-4.3.2.24	Selection of highest value
	6-7.3.3.9	
139	2-4.3.2.25	Selection of lowest value
	6-7.3.3.10	
140	2-4.3.2.26	Comparing
	6-7.3.3.11	
141	2-4.3.2.27	Synchronizing
142	2-4.3.2.28	Logic AND-function
	6-7.3.3.12	
143	2-4.3.2.29	Logic OR-function
	6-7.3.3.13	
144	2-4.3.2.30	Automatic operation
145	2-4.3.2.31	Complex function
	6-7.3.3.14	
	13-4.3.29	Complex function, multi-function
148	2-4.3.2.32	Indicating
149	2-4.3.2.33	Registering; recording, printing
150	2-4.3.2.34	Page printing
151	2-4.3.2.35	Facsimile
152	2-4.3.2.36	Perforating
153	2-4.3.2.37	Input by keyboard
154	2-4.3.2.38	Test point
161	2-4.3.3.1	Dividing
	6-7.3.3.15	
162	2-4.3.3.2	Bias
	6-7.3.3.16	
163	2-4.3.3.3	Reverse
	6-7.3.3.17	
171	2-4.3.4.1	Change of state when the characteristic quantity passes a set value from below
	8-4.3.1.5	
172	2-4.3.4.2	Change of state when the characteristic quantity passes a set value from above
	8-4.3.1.6	
173	2-4.3.4.3	Change of state when the characteristic quantity passes an upper set value from below or a lower set value from above
174	2-4.3.4.4	Change of state when the characteristic quantity is equal to a set value
175	2-4.3.4.5	Change of state when the characteristic quantity is approximately equal to a set value
181	2-4.3.5.1	Logic negation
	6-7.3.3.18	
182	2-4.3.5.2	Logic inversion
183	2-4.3.5.3	Input or output for auxiliary power supply
201	2-5.1.1	Adjustability
	8-4.3.1.3	
	8-5.3.3	
	9-4.3.1	
	10-4.3.1	
	10-5.3.1	
	14-4.3.1	

Registration number	Location (Part-subclause)	Description
202	2-5.1.2	Non-linear adjustability
203	2-5.1.3	Pre-set adjustability
	8-4.3.1.4	
	8-5.3.4	
	10-4.3.2	
204	2-5.1.4	Inherent variability
205	2-5.1.5	Non-linear inherent variability
211	2-5.3.1	Stepwise variability
212	2-5.3.2	Continuous variability
221	2-6.1.1	Constant force, motion, or flow
	9-4.3.2	
	10-4.3.3	
222	2-6.1.2	Constant force, motion, or flow
	9-4.3.3	
	10-4.3.4	
223	2-6.1.3	Approximately constant force, motion, or flow
224	2-6.1.4	Sinusoidal force, motion, or flow
	10-4.3.5	
225	2-6.1.5	Pulse-shaped force, motion, or flow
	9-4.3.4	
	10-4.3.6	
226	2-6.1.6	Burst of sinusoidal flow
227	2-6.1.7	Saw-tooth shaped force, motion, or flow
228	2-6.1.8	Oscillating motion
229	2-6.1.9	Positive-going pulse
230	2-6.1.10	Negative-going pulse
231	2-6.1.11	Positive-going step
232	2-6.1.12	Negative-going step
233	2-6.1.13	Stepping function
	10-4.3.7	
234	2-6.1.14	Analogue signal
	6-4.3.5	
235	2-6.1.15	Digital signal
	6-4.3.6	
236	2-6.1.16	Binary signal
	6-4.3.7	
241	2-7.1.1	Direction in general, except for energy and signal flow
	14-4.3.2	
	15-10.3.3	
242	2-7.1.2	Direction in general, except for energy and signal flow
243	2-7.1.3	Working direction of hydraulic power
244	2-7.1.4	Working direction of pneumatic power
245	2-7.1.5	Alternative directions in general, except for energy, propagation, and signal flow
	14-4.3.3	
246	2-7.1.6	Alternative directions in general, except for energy, propagation, and signal flow
247	14-4.3.4	Bidirectional, simultaneously
249	2-7.1.7	Direction of propagation, energy, or signal flow (simplex)
	6-4.3.2	
250	2-7.1.8	Alternative directions of propagation, energy, or signal flow (half-duplex)
	6-4.3.3	
251	2-7.1.9	Directions of propagation, energy, or signal flow, simultaneously in both directions possible (full-duplex)
	6-4.3.4	
252	2-7.1.10	Transmission
253	2-7.1.11	Reception
254	2-7.1.2	Circular motion, unspecified direction
	12-4.3.1	
255	2-7.1.13	Direction of circular motion
	12-4.3.2	
256	2-7.1.14	Alternative directions of circular motion
261	2-7.3.1	Limit
262	2-7.3.2	Momentary and partial reversal of motion
263	2-7.3.3	Correlation indication
301	2-9.1.1	Envelope, tank
	11-4.1.1	
	12-4.1.2	
321	2-10.1.1	Liquid
	15-10.3.4	
322	2-10.1.2	Gas
325	2-10.1.3	Insulating material
326	2-10.1.4	Permanent magnet
	12-4.3.6	Permanent-magnet type
327	2-10.1.5	Bimetal
328	2-10.1.6	Material of other type
341	2-11.1.1	One item only
342	2-11.1.2	Two identical items
343	2-11.1.3	Three identical items
344	2-11.1.4	Two or more identical items
345	2-11.1.5	Two or more identical items
401	3-4.1.1	Functional connection
	6-4.1.1	
402	3-4.1.2	Mechanical link, shaft
403	3-4.1.3	Mechanical link, shaft, wire
404	3-4.1.4	Electrically insulating mechanical link, shaft, wire
405	3-4.1.5	Pipeline, duct
406	3-4.1.6	Group of pipelines, ducts
411	3-4.1.7	Non-guided, electromagnetic beam
412	3-4.1.8	Planned pipeline, duct
413	3-4.1.9	Group of planned pipelines, ducts
422	3-4.1.10	Pilot (control), drain, purge, or bleed line in fluid power systems
431	3-4.3.1	Pure functional type
	6-4.3.1	
432	3-4.3.2	Capillary type
433	3-4.3.3	Pneumatic type
434	3-4.3.4	Hydraulic type
435	3-4.3.5	Electric type
442	3-4.3.6	Unidirectional information bus type
443	3-4.3.7	Bidirectional information bus type
444	3-4.3.8	Flexible type
445	3-4.3.10	Circular shape
446	3-4.3.11	Rectangular shape
447	3-4.3.12	Ridged shape
448	3-4.3.13	Twisted pipeline, or duct
449	3-4.3.14	Cable
450	3-4.3.15	Twisting of pipelines
451	3-4.3.16	Internal connection
452	3-4.3.9	Flexible type
501	3-5.1.1	Joint of connections
	6-4.1.2	
503	3-5.1.3	Closed end of pipeline or duct
511	3-6.1.1	Flange coupling, flange pair
512	3-6.1.2	Flexible coupling
513	3-6.1.3	Clamped flanged coupling
514	3-6.1.4	Screwed joint
515	3-6.1.5	Welded, brazed, or soldered joint
516	3-6.1.6	Change of pipe dimension, pipe reducer
517	3-6.1.7	Blind flange pair
518	3-6.1.8	End cap
531	3-7.1.1	Expansion loop
532	3-7.1.2	Expansion sleeve
533	3-7.1.3	Expansion bellows
561	3-8.1.1	Port
563	3-8.1.2	Quick-release coupling element of male type
564	3-8.1.3	Quick-release coupling element of female type

Registration number	Location (Part-subclause)	Description
565	3-8.1.4	Quick-release coupling element which fits into another coupling element of the same type
566	3-8.1.5	Quick-release coupling element of male type with automatic closing
567	3-8.1.6	Quick-release coupling element of female type with automatic closing
568	3-8.1.7	Quick-release coupling element which fits into another coupling element of the same type with automatic closing
576	3-8.1.8	Fixed portion of a connector pair; socket
577	3-8.1.9	Movable portion of a connector pair; plug
601	3-9.1.1	Connection with n parallel, identical branches
602	3-9.1.2	Transition between multi-line and single-line representation
603	3-9.1.3	Exit from or entrance into a bundle
651	4-4.1.6	Delay device
	6-6.3.1	
652	4-4.1.7	Delay device
	6-6.3.2	
653	4-4.1.8	Delay device with delay in both directions
	6-6.3.3	
654	4-4.1.9	Automatic return device
	6-6.3.4	
655	4-4.1.11	Detent for detaining in a discrete position
	6-6.3.5	
656	4-4.1.12	Detent for detaining in a discrete position in disengaged position
657	4-4.1.13	Detent for detaining in a discrete position in engaged position
658	4-4.1.14	Indication of position without detention
659	4-4.1.15	Detent for detaining in any position
	6-6.3.6	
660	4-4.1.16	Detent for detaining in any position; drift to the left permitted
	6-6.3.7	
661	4-4.1.17	Latching device
	6-6.3.8	
662	4-4.1.18	Latching device in disengaged position
663	4-4.1.19	Latching device in engaged position
664	4-4.1.20	Blocking device
	6-6.3.9	
665	4-4.1.21	Trip-free mechanism
666	4-4.1.22	Interlocking device
	6-6.3.10	
681	4-5.1.1	Manual actuator
682	4-5.1.2	Manual actuator operated by pushing
683	4-5.1.3	Manual actuator operated by pulling
684	4-5.1.4	Manual actuator operated by pushing and pulling
685	4-5.1.5	Manual actuator operated by turning
686	4-5.1.6	Manual actuator in the form of a removable handle
687	4-5.1.7	Manual actuator in the form of a key
688	4-5.1.8	Manual actuator in the form of a lever
689	4-5.1.9	Manual actuator in the form of a pedal
690	4-5.1.10	Manual actuator in the form of a treadle
691	4-5.1.11	Manual actuator with special shape for safety purpose
692	4-5.1.12	Device for restricted access to actuator
701	4-5.3.1	Indication of positions of a controlled element
702	4-5.3.2	Indication of positions of a controlled element
703	4-5.3.3	Indication of positions of a controlled element
704	4-5.3.4	Indication of positions of a controlled element

Registration number	Location (Part-subclause)	Description
711	4-6.1.1	Plunger; tracer
	7-4.1.1	
712	4-6.1.2	Roller
	7-4.1.2	
713	4-6.1.3	Cam profile
	7-4.1.3	
714	4-6.1.4	Cam-operated actuator
715	4-6.1.5	Fluid-level-operated actuator
	5-4.3.1.1	Float type
	7-4.1.4	Fluid-level-operated actuator
716	4-6.1.6	Flow-target-operated actuator
	7-4.1.5	
717	4-6.1.7	Single-acting hydraulic actuator
718	4-6.1.8	Single-acting pneumatic actuator
719	4-6.1.9	Double-acting hydraulic actuator
720	4-6.1.10	Double-acting pneumatic actuator
721	4-6.1.11	Double-acting hydraulic actuator with different active areas
722	4-6.1.12	Double-acting pneumatic actuator with different active areas
723	4-6.1.13	Actuator in the form of a single-acting fluid cylinder
724	4-6.1.14	Actuator in the form of a double-acting fluid cylinder
725	4-6.1.15	Single-acting diaphragm actuator
726	4-6.1.16	Double-acting diaphragm actuator
733	4-6.1.19	Actuator operating when a characteristic quantity passes a set value
741	4-7.1.1	Actuating device
751	5-4.1.1	Sensor
752	5-4.1.2	Sensor
	15-8.1.1	
753	5-4.1.3	Signal converter, measuring transducer
754	5-4.1.4	Measuring transducer
755	5-4.1.5	Signal converter, measuring transducer without connection between input and output circuits
756	5-4.1.6	Signal converter, measuring transducer without connection between input and output circuits
757	5-4.1.7	Thermocouple
759	5-4.1.8	Tachometer generator
760	5-4.1.9	Measuring transducer utilizing the synchro effect
771	5-4.3.1.2	Displacer type
	7-4.1.6	Displacer
772	5-4.3.1.4	Orifice plate type
	7-5.1.2	Orifice plate
773	5-4.3.1.5	Flow nozzle type
	7-5.1.3	Flow nozzle
774	5-4.3.1.6	Critical flow nozzle type
	7-5.1.4	Critical flow nozzle
775	5-4.3.1.7	Venturi tube type
	7-5.1.5	Venturi element
776	5-4.3.1.8	Flow elbow type
777	5-4.3.1.9	Variable area flow type
778	5-4.3.1.10	Pitot tube type
791	5-4.3.2.1	Rotatable stator type
792	5-4.3.2.2	Controlling
793	5-4.3.2.3	Differential type
794	5-4.3.2.4	Resolving/Receiver
795	5-4.3.2.5	Torque measurement/Transformer
796	5-4.3.2.6	Measuring transducer; transmitter
801	5-5.1.1	Boss with well
802	5-5.1.2	Insertion pipe
803	5-5.1.3	Boss with insertion pipe
831	5-7.1.1	Thermometer
832	5-7.1.2	Indicating measuring instrument
833	5-7.1.3	Recording measuring instrument

Registration number	Location (Part-subclause)	Description
834	5-7.1.4	Integrating measuring instrument
841	5-8.1.1	Counter
842	5-8.1.2	Clock
843	5-8.1.3	Master clock
851	5-9.1.1	Display unit
863	5-10.1.1	Mechanical indicator
864	5-10.1.2	Electromechanical indicator
865	5-10.1.3	Electromechanical position indicator
866	5-10.1.4	Acoustic signalling device
891	5-12.1.1	Amplifier
892	5-12.1.2	Amplifier
893	5-12.1.3	Amplifier with return channel
894	5-12.1.4	Amplifier with return channel
895	5-12.1.5	Feedback controller
896	5-12.1.6	Feedback controller
1011	6-5.1.1	Point of measurement
1021	6-6.1.1	Manual operation of a final controlling element
1022	6-6.1.2	Automatic operation of a final controlling element
1041	6-7.1.1	Information processing function
1042	6-7.1.2	Information processing function performed by time-sharing
1051	6-7.3.1.1	Alarming
1052	6-7.3.1.2	Displaying discrete state
1053	6-7.3.1.3	Controlling
1054	6-7.3.1.4	Density/Difference
1055	6-7.3.1.5	Electric variable/Sensing
1056	6-7.3.1.6	Flow rate/Ratio, fraction
1057	6-7.3.1.7	Gauge, position, length/Viewing
1058	6-7.3.1.8	Hand
1059	6-7.3.1.9	Indicating
1060	6-7.3.1.10	Power/Scanning
1061	6-7.3.1.11	Time/Time rate of change
1062	6-7.3.1.12	Level
1063	6-7.3.1.13	Moisture, humidity/Momentarily
1064	6-7.3.1.14	User's choice
1065	6-7.3.1.15	User's choice
1066	6-7.3.1.16	Pressure/Connection of test point
1067	6-7.3.1.17	Quality/Integral, total/Integrating, summing
1068	6-7.3.1.18	Radiation/Registering, recording
1069	6-7.3.1.19	Speed, frequency/Switching
1070	6-7.3.1.20	Temperature/Transmitting
1071	6-7.3.1.21	Multi-variable/Multi-function
1072	6-7.3.1.22	User's choice/Impact on process by valve, pump, etc.
1073	6-7.3.1.23	Weight, force/Multiplying
1074	6-7.3.1.24	Unclassified
1075	6-7.3.1.25	User's choice/Converting, computing
1076	6-7.3.1.26	Number of events, quantity/Emergency or safety acting
1081	6-7.3.2.1	High
1082	6-7.3.2.2	Very high
1083	6-7.3.2.3	Very high
1084	6-7.3.2.4	Extremely high
1085	6-7.3.2.5	Extremely high
1086	6-7.3.2.6	Low
1087	6-7.3.2.7	Very low
1088	6-7.3.2.8	Very low
1089	6-7.3.2.9	Extremely low
1090	6-7.3.2.10	Extremely low
1091	6-7.3.2.11	High or low
1101	6-7.3.4.1	Primary location in a central control room
1102	6-7.3.4.2	Auxiliary location in a central control room
1103	6-7.3.4.3	Primary location in a local control room or on a local control panel
1104	6-7.3.4.4	Auxiliary location in a local control room or on a local control panel
2001	7-4.1.7	Weight
2002	4-4.1.10	Spring
	7-4.1.8	
2003	5-4.3.1.3	Membrane type; diaphragm type
	7-4.1.9	Membrane; diaphragm
2004	7-4.1.10	Membrane; diaphragm
2005	3-5.1.2	Joint of two mechanical parts permitting motion of the parts in two or more dimensions
	7-4.1.11	
2006	7-4.1.12	Bearing
2007	7-4.1.13	Buffer head
2008	4-4.1.1	Mechanical gear pair
	7-4.1.14	
2009	4-4.1.2	Clutch, disengaged in unactuated state
	7-4.1.15	
2010	4-4.1.3	Clutch, engaged in unactuated state
	7-4.1.16	
2011	4-4.1.4	Brake, disengaged in unactuated state
	7-4.1.17	
2012	4-4.1.5	Brake, applied in unactuated state
	7-4.1.18	
2013	7-4.1.19	Wheel
2014	7-4.1.20	Ball
2015	7-4.1.21	Ball
2031	7-5.1.1	Restrictor
2032	7-5.1.6	Flow straightener
2033	7-5.1.7	Silencer
2034	7-5.1.8	Viewing glass
2035	7-5.1.9	Rupturing disc
2036	7-5.1.10	Flame arrestor
2037	7-5.1.11	Spray nozzle
	11-4.1.2	
	12-4.1.10	
2038	7-5.1.12	Siphon, anti-siphon trap
	15-10.3.5	
2039	7-5.1.13	Vent
2040	7-5.1.14	Drain funnel
2041	7-5.1.15	Stack
2042	7-5.1.16	Pig receiver: launcher
2043	7-5.1.17	Blind
2044	7-5.1.18	Spectacle blind in closed position
2045	7-5.1.19	Spectacle blind in open position
2061	7-6.1.1	Container, tank, cistern for atmospheric pressure
	15-10.3.6	
2062	7-6.1.2	Pressure or vacuum vessel
2063	7-6.1.3	Pressure or vacuum vessel
2064	7-6.1.4	Bunker
2065	7-6.1.5	Open store
2066	7-6.1.6	Shelf store
2067	7-6.1.7	Barrel
2068	7-6.1.8	Bag
2101	8-4.1.1	Two-way valve
2102	8-4.1.2	Angled two-way valve
2103	8-4.1.3	Three-way valve
2104	8-4.1.4	Four-way valve
2111	8-4.3.1.1	Non-return function; check function
	8-5.3.1	
2112	8-4.3.1.2	Safety function
	8-5.3.2	
2113	8-4.3.1.7	L-bore in a three- or four-way valve
2114	8-4.3.1.8	T-bore in a three- or four-way valve
2115	8-4.3.1.9	Double L-bore in a four-way valve
2121	8-4.3.2.1	Globe type
2122	8-4.3.2.2	Ball type
2123	8-4.3.2.3	Plug type
2124	8-4.3.2.4	Gate type
2125	8-4.3.2.5	Needle type
2126	8-4.3.2.6	Disc or butterfly type

Registration number	Location (Part-subclause)	Description
2127	8-4.3.2.7	Piston type, plunger type
2128	8-4.3.2.8	Diaphragm type
2129	8-4.3.2.9	Hose type
2130	8-4.3.2.10	Reduced bore
2131	8-4.3.2.11	Jacket
2151	8-5.1.1	Two- or three-way damper
2161	8-6.1.1	Valve for fluid power systems
2162	8-6.1.2	Seat of a non-return valve
2163	8-6.1.3	Moving part of a non-return valve
2171	8-6.3.1	Open flow path
2172	8-6.3.2	Closed flow path
2173	8-6.3.3	Closed flow path of a leak-free valve
2174	8-6.3.4	Flow to open air
2175	8-6.3.5	Infinite number of intermediate positions of a valve
2176	8-6.3.6	Transitory position
2177	8-6.3.7	Affected area
2181	8-8.1.1	Self-operating release valve, steam trap or vent
2301	9-4.1.1 15-10.3.7	Liquid pump
2302	9-4.1.2	Gas pump, vacuum pump, compressor, fan
2303	9-4.1.3	Liquid pump with alternative directions of flow
2304	9-4.1.4	Gas pump, compressor, fan with alternative directions of flow
2321	9-4.3.5 10-4.3.8	Positive displacement type
2322	9-4.3.6 10-4.3.9	Rotodynamic type
2323	9-4.3.7	Turbo-molecular type
2331	9-5.1.1	Ejector pump
2332	9-5.1.2	Diffusion pump
2333	9-5.1.3	Diffusion-ejector pump
2334	9-5.1.4	Gas-lift pump
2335	9-5.1.5	Entrapment pump
2336	9-5.1.6	Adsorption pump
2337	9-5.1.7	Getter pump
2338	9-5.1.8	Getter ion pump
2339	9-5.1.9	Cryo pump
2351	9-6.1.1	Electric liquid pump
2352	9-6.1.2	Electric induction liquid pump
2353	9-6.1.3	Electric induction liquid pump
2401	10-4.1.1	Hydraulic pump
2402	10-4.1.2	Pneumatic pump, compressor
2403	10-4.1.3	Hydraulic pump with alternative directions of flow
2404	10-4.1.4	Pneumatic pump with alternative directions of flow
2405	5-4.3.1.11 10-4.1.5	Rotary type, turbine type Hydraulic motor
2406	10-4.1.6	Pneumatic motor
2407	4-6.1.17 10-4.1.7	Actuator in the form of a hydraulic motor with alternative directions of flow Hydraulic motor with alternative directions of flow
2408	4-6.1.18 10-4.1.8	Actuator in the form of a pneumatic motor with alternative directions of flow Pneumatic motor with alternative directions of flow
2409	10-4.1.9	Hydraulic pump/motor
2410	10-4.1.10	Pneumatic pump/motor
2411	10-4.1.11	Hydraulic pump/motor acting as a pump with one direction of flow and as a motor in the other direction of flow
2412	10-4.1.12	Pneumatic pump/motor acting as a pump with one direction of flow and as a motor in the other direction of flow
2413	10-4.1.13	Hydraulic pump/motor acting as a pump with alternative directions of flow or as a motor with alternative directions of flow
2414	10-4.1.14	Pneumatic pump/motor acting as a pump with alternative directions of flow or as a motor with alternative directions of flow
2415	10-4.1.15	Hydraulic semi-rotary motor
2416	10-4.1.16	Pneumatic semi-rotary motor
2431	10-5.1.1	Linear pneumatic-hydraulic converter
2432	10-5.1.3	Linear pneumatic-hydraulic pressure intensifier
2434	10-5.1.5	Hydraulic rotary torque converter
2435	10-5.1.2	Continuous pneumatic-hydraulic converter
2436	10-5.1.4	Continuous pneumatic-hydraulic intensifier
2441	10-6.1.1	Single-acting hydraulic extension cylinder with single-ended piston rod
2442	10-6.1.5	Double-acting hydraulic cylinder with single-ended piston rod
2443	10-6.1.7	Single-acting hydraulic telescopic cylinder
2444	10-6.1.11	Cushion
2445	10-6.1.2	Single-acting pneumatic extension cylinder with single-acting piston rod
2446	10-6.1.3	Single-acting hydraulic retraction cylinder with single-ended piston rod
2447	10-6.1.4	Single-acting pneumatic retraction cylinder with single-ended piston rod
2448	10-6.1.6	Double-acting pneumatic cylinder with single-ended piston rod
2449	10-6.1.8	Single-acting pneumatic telescopic cylinder
2450	10-6.1.9	Double-acting hydraulic telescopic cylinder
2451	10-6.1.10	Double-acting pneumatic telescopic cylinder
2501	11-4.1.3 11-7.3.6 12-4.3.7 15-10.3.8	Heating or cooling coil Heat exchanger type
2502	11-4.1.4	Finned tube
2511	11-5.1.1	Heat exchanger with straight tubes
2512	11-5.1.2	Heat exchanger of floating type
2513	11-5.1.3	Heat exchanger with U-shaped tubes
2514	11-5.1.4	Heat exchanger with coil-shaped tubes
2515	11-5.1.5	Heat exchanger of double-pipe type
2516	11-5.1.6	Heat exchanger of plate type
2517	11-5.1.7	Heat exchanger of spiral type
2518	11-5.1.8	Regenerative pre-heater
2521	11-6.1.1	Cooling tower
2531	11-7.1.1	Boiler, steam generator
2532	11-7.1.2	Boiler with dome
2533	11-7.1.3	Furnace
2541	11-7.3.2 12-4.3.9 15-9.3.1 15-10.3.9	Fired type
2551	11-8.1.1	Heat pump, refrigerator, or freezer
2571	11-9.1.1	Steam turbine
2572	11-9.1.2	Steam turbine with centre inlet
2573	11-9.1.3	Gas turbine
2574	11-9.1.4	Jet motor
2575	11-9.1.5	Turbo-fan jet motor
2581	11-10.1.1	Reciprocating steam engine
2582	11-10.1.2	Internal combustion engine
2583	11-10.1.3	External combustion engine
2591	11-11.1.1	Flare
2601	12-4.1.1	Device for separating
2602	12-4.1.3	Screen or filter element
2603	12-4.1.4	Bed filter element of fixed type

Registration number	Location (Part-subclause)	Description
2604	12-4.1.5	Bed filter element of fluidized type
2605	12-4.1.6	Scraper
2606	12-4.1.7	Disc with knife
2607	12-4.1.8	Plate for separating
2608	12-4.1.9	Centrifuge rotor
2621	12-4.3.3	Cyclonic type
2622	12-4.3.10	Chemical type
2623	12-4.3.11	Biological type
2624	12-4.3.12	Ion exchange type
2651	12-5.1.1	Purifier using conversion
2661	12-5.3.1	Catalytic type
2671	12-6.1.1	Device for mixing
2672	12-6.1.2	Rotary mixing element
2673	12-6.1.3	Static mixing element
2691	12-7.1.1	Air conditioner for pneumatic systems
2801	13-4.3.1	Casting or moulding
2802	13-4.3.2	Material forming by forging
2803	13-4.3.3	Material forming by pressing
2804	13-4.3.4	Material forming by bending or folding
2805	13-4.3.5	Material forming by rolling
2806	13-4.3.6	Material forming by extruding or pultruding
2807	13-4.3.7	Heat treatment, for example, annealing or tempering
2808	13-4.3.8	Size reduction by crushing, breaking, or pulverization
2809	13-4.3.9	Size enlarging by sintering, agglomeration, coagulation, or flocculation
2810	13-4.3.10	Dividing material
2811	13-4.3.11	Dividing by sawing
2812	13-4.3.12	Dividing by shearing
2814	13-4.3.14	Dividing by laser beam
2815	13-4.3.15	Boring, drilling
2816	13-4.3.16	Reaming
2817	13-4.3.17	Planing
2818	13-4.3.18	Broaching
2819	13-4.3.19	Tapping
2820	13-4.3.20	Threading
2821	13-4.3.21	Milling
2822	13-4.3.22	Turning
2823	13-4.3.23	Joining, for example, by riveting, glueing, welding, brazing or soldering
2824	13-4.3.24	Surface treatment by removal of material, for example, by grinding, honing, polishing, or sanding
2825	13-4.3.25	Surface treatment without removal of material, for example, by rolling
2826	13-4.3.26	Calendering
2827	13-4.3.27	Coating, for example, painting
2828	13-4.3.28	Sealing, for example, by caulking
3001	15-4.1.1	Sleeve for penetration of construction, for example, a wall; wall duct
3002	15-4.1.2	Seal for penetration of construction, for example, a wall; sealed wall duct
3003	15-4.1.3	Seal for penetration of construction partitioning a space with different air pressure.
3004	15-4.1.4	Anchor point
3005	15-4.1.5	Guide bracket, for example, for pipelines
3051	15-4.3.1	Located underground, for example, pipeline, cable, or joint
3052	15-4.3.2	Located underwater, for example, pipeline or cable
3053	15-4.3.3	Located on poles, for example, pipeline, cable, or power line
3054	15-4.3.4	Located in a circular duct or pipe, for example, conductors or cables
3055	15-4.3.5	Located in a rectangular duct, for example, pipelines, conductors, or cables
3056	15-4.3.6	Located on a tray, for example, pipelines, conductors, or cables; endpoints indicated
3057	15-4.3.7	Located on a tray, for example, pipelines, conductors, or cables; continuous
3058	15-4.3.8	Going to a storey above, for example, pipeline, cable, or conductor bundle
3059	15-4.3.9	Going to a storey below, for example, pipeline, cable, or conductor bundle
3060	15-4.3.10	Going between a storey above and a storey below, for example, pipeline, cable, or conductor bundle
3061	14-4.3.5 15-4.3.11	Slope, for example, of a pipeline
3062	15-4.3.12	Information
3063	15-4.3.13	Blocking of electric current
3064	15-4.3.14	Sound
3065	15-4.3.15	Control
3066	15-4.3.16	Alarm
3067	15-4.3.17	Light alarm
3068	15-4.3.18	Sound (acoustic) alarm
3069	15-4.3.19	Vibrating (tactile) alarm
3081	15-5.1.1	Connection box, junction box
3082	15-5.1.2	Consumers terminal, service entrance equipment
3083	15-5.1.3	Distribution centre
3084	15-5.1.4	Enclosure
3085	15-5.1.5	Cross-connection device
3086	15-5.1.6	Square-shaped access chamber, inspection well
3087	15-5.1.7	Circular-shaped access chamber, inspection well
3101	15-6.1	Outlet tap
3102	15-6.2	Outlet tap in taphole
3103	15-6.3	Outlet tap on wall
3104	15-6.4	Mixing outlet tap
3105	15-6.5	Mixing outlet tap in taphole
3106	15-6.6	Mixing outlet tap on wall
3107	15-6.7	Self-closing outlet tap
3108	15-6.8	Hand-held shower
3109	15-6.9	Flushing valve with pipe interrupter
3121	15-7.1	Underground hydrant
3122	15-7.2	Above ground hydrant
3123	15-7.3	Wall hydrant
3124	15-7.4	First aid fire hose reel
3132	15-8.1.2	Detector, pilot switch
3133	15-8.1.3	Electric window foil
3134	15-8.1.4	Protection unit for potable water systems
3141	15-8.3.1	Sound
3142	15-8.3.2	Fire
3143	15-8.3.3	Smoke
3144	15-8.3.4	Dust
3151	15-9.3.2	Air conditioning
3201	15-10.3.10	Heat pump type; temperature increase
3202	15-10.3.11	Heat pump type; temperature decrease
3203	15-10.3.12	Electric type
3204	15-10.3.13	Sewage water
3205	15-10.3.14	Salt
3206	15-10.3.15	Pond
3207	15-10.3.16	Waste
3801	14-4.1.1	Conveyor
3806	14-4.1.2	Feeding funnel, hopper
3807	14-4.1.3	Vane feeder rotor
3808	14-4.1.4	Turn table
3821	14-4.3.6	Belt type
3822	14-4.3.7	Belt type with scraper flights
3823	14-4.3.8	Chain or wire driven type
3824	14-4.3.9	Roller type
3825	14-4.3.10	Ropeway type, overhead type

Registration number	Location (Part-subclause)	Description
3828	14-4.3.11	Bucket type
3830	14-4.3.12	Screw type
3831	14-4.3.13 15-8.3.5	Vibration, vibrating type
3832	14-4.3.14	Gravity type
3833	14-4.3.15	Spiral gravity (sliding) type
3834	14-4.3.16	Escalator function
3841	14-5.1.1	Crane
3842	14-5.1.2	Lift, hoist
3843	14-5.1.3	Materials handling robot
3851	14-6.1.1	Mono-rail
3852	14-6.1.2	Double rail, railway track
3853	14-6.1.3	Traverser, traversing platform
3854	14-6.1.4	Track turntable
3855	14-6.1.5	Railway wagon tip, platform tip
3861	14-7.1.1	Industrial truck
3862	14-7.1.2	Fork lift truck
3863	14-7.1.3	Driverless, automatic fork lift truck, including remote controlled
3864	14-7.1.4	Container truck
3865	14-7.1.5	Wheel loader
3866	14-7.1.6	Log loader
3867	14-7.1.7	Bulldozer
3868	14-7.1.8	Lorry
3869	14-7.1.9	Covered lorry, van
3870	14-7.1.10	Tank truck
3871	14-7.1.11	Open railway wagon or open trailer
3872	14-7.1.12	Covered railway wagon or covered trailer
3873	14-7.1.13	Railway wagon or trailer for non-solid material
3874	14-7.1.14.	Railway tanker or trailer tanker
3875	14-7.1.15	Locomotive
3881	14-7.1.16	Cargo ship
IEC	5-4.3.1.13	Capacitive type
IEC	5-4.3.1.14	Conductive electrode type
IEC	5-4.3.1.16	Receiving ultrasonic type
IEC	5-4.3.1.12	Strain gauge type
IEC	5-4.3.1.15	Transmitting ultrasonic type
IEC	5-4.3.1.17	Transmitting and receiving ultrasonic type
IEC	5-4.3.1.18	Radioactive type
IEC	5-4.3.1.19	Optical type
IEC	5-4.3.1.20	Semiconductor type
IEC	11-7.3.1	Ionizing radiation type, nuclear type
IEC	11-7.3.4	Electric electrode type
IEC	11-7.3.3	Electric heating element type
IEC	11-7.3.5	Electric induction type
IEC	12-4.3.8	Electro-thermal type
IEC	12-4.3.5	Electromagnetic type
IEC	12-4.3.4	Electrostatic type
IEC	13-4.3.13	Laser generator

Annex C
(informative)

Cross-reference index

This index of cross-references is intended to link those graphic symbols with registration numbers to corresponding items in other, existing ISO and IEC standards.

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
101	02-01-01 to -03	5.3.2 to 5.3.5	3-3.1.1.1 3-3.1.2.1 3-3.3.1	4.5.0 5.3.0	1.3; 1.4	
106	12-09-01 to -50					
107	12-54.6					
111, 112	02-17-06, 06A		3-3.1.2.6			
113, 114	02-17-07 02-08-07					
115	02-03-12 12-09-08A 12-09-08B 12-29					
119	02-08-04					
121	02-13-06					
122	02-13-07					
123	02-08-05 12-40-01					
124	12-30-01					
125						IEC 60417-5302
126	12-09-11					
127	13-05-13					
128		9.5.2.2				
129	12-09-01					
130						
131	(10-11-01)					
132						
133, 134	10-17.1		2-8.3			
135, 136	10-17.1		2-8.4			
137	10-17-02					
138			2-8.5			
139			2-8.6			
140	12-38-05					

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
141	08-02-08					
142	12-27-02					
143	12-27-01					
144	02-03-11					
145	12-54-01					
148	(08-01-01)		3-3.1.1.2	(8.0.0)		
149	(08-04-12) (09-06-03)			(8.0.1)		
150	(09-06-06)					
151	(09-06-04)					
152	(09-06-05)					
153	(09-06-03)					
154	02-17-05					
161						ISO 31-11
162			2-8.13			
163			2-8.7			
171	02-06-01					
172	02-06-02					
173	02-06-03					
174	02-06-04					
175	02-06-05					
181	12-07-01, 02		2-10.2.1 to -10.2.4			
182	12-07-03 to -06					
183	12-10-01 13-05-01, 02					
201	02-03-01	5.4.2.3				
202	02-03-02					
203	02-03-05					
204	02-03-03					
205	02-03-04					
211	02-03-07					
212	03-03-09					
221	02-02-03					
222						
223	02-02-12					
224	02-02-04					
225	10-12-04					
226	02-10-03					

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
227	02-10-06					
228	02-04-06					
229	02-10-01					
230	02-10-02					
231	02-10-04					
232	02-10-05					
233	02-03-07					
234	02-17-08		2-8.11 3-3.1.1.2.1			
235	02-17-09		2-8.11 3-3.1.1.2.2			
236	12-33-03, 05 to 08					
241, 242	02-04-01	5.4.2.1 5.4.1.1		4.1.8	1.1.1	ISO 3753-4.5.1 ISO 3952-1-1.8.1 IEC 60375
243		5.4.1.1				
244		5.4.1.2				
245, 246	02-04-02	5.4.2.1				ISO 3952-1-1.8.5
249	02-05-01		1-5.1.4			
250	02-05-03					
251	02-05-02					
252	02-05-04					
253	02-05-05					
254	10-07-15	6.2.2.4				ISO 3952-1-1.8.1
255	02-04-03	5.4.2.2				ISO 3952-1-1.8.1
256	02-04-04	5.4.2.2				ISO 3952-1-1.8.5
261	02-04-05					ISO 3952-1-1.8.10
262						ISO 3952-1 1.8.4
263	06-09-03 07-15-16 to -18					IEC 60375 IEC 61082-1 (Figure 68) IEC 61082-2 (Figure 20)
301	02-01-04, 05	5.3.6				ISO 3753-4.7.1
321	02-97-03		3-3.3.3.4			
322	02-07-04		3-3.3.3.5			
325	02-07-02					
326	02-17-03					
327			3-3.3.3.6			IEC 60051-1-F-15
328	02-07-01					

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
341 to 343	03-01-02		3-3.4.3.1			
344	03-01-03					
345						IEC 61082-1-4.6.3
401	03-01-01		1-5.1.2			
402 to 404	02-12-01, 04	5.3.1.4; 8.2.2	3-3.2.4.1			ISO 3952-1-3.2
405	02-12-01	5.3.1.1, 2	1-5.1 to -5.4 3-3.4	4.1.0 to 2; 5.1.0	1.1	ISO 3753-4.5.1
406						
411	10-01-06					
412, 413						
422		5.3.1.2				
431			1-5.1.2 3-3.4.2.1			
432			2-5.4 3-3.4.3.4			
433			2-5.2 3-3.4.3.2			
434			2-5.3 3-3.4.3.3			
435		5.4.3.1	2-5.1 3-3.4.3.1			
442	12-55-01					
443	12-55-02					
444	03-01-06	6.1.2.3		4.1.7	2.4	
445	10-07-03					
446	10-07-01					
447	10-07-04					
448	10-07-11					
449	03-01-09, 10					
450	03-01-08					
451						IEC 61082-2-2.4.4.2
452		6.1.2.3				
501	03-02-01	6.1.2.1	1-5.1.3	4.1.4; 4.2.0	2.2, 3	ISO 3753-4.5.2
503		5.4.3.2				
511				4.2.2	2.5	
512						
513						
514					2.7	
515						ISO 2553

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
516						
517				4.2.5	2.13	
518				4.1.11	2.12	
531				4.1.10	2.10	
532				4.1.10	2.9	
533				4.1.10	2.11	
561						
563		6.2.2.3		4.2.1		
564		6.2.2.3		4.2.1		
565		6.2.2.3			2.8	
566		6.2.2.3				
567		6.2.2.3				
568		6.2.2.3				
576	03-03-09					
577	03-03-10					
601	03-02-09					
602						IEC 61082-1-4.4.7.2
603						IEC 61082-1-4.4.7.2
651	02-12-05					
652	02-12-06					
653	07-05-05					
654	02-12-07	7.3.2.3	2-3.7 3-3.2.3.5	4.3.5	(3.12)	
655	02-12-08	7.2.1.3				
656	02-12-09	7.2.1.3				
657	02-12-10	7.2.1.3				
658		7.2.1.3				
659			2-3.7 3-3.2.3.5	4.3.5		
660			2-3.7			
661 to 663	02-12-12, 13	7.2.1.4	3-3.2.3.1, 3-3.2.3.2			
664	02-12-14					
665	07-13-11					
666	02-12-11					
681	02-13-01	7.3.1.1	3-3.2.2.1	6.0.0	4.1	ISO 3753-4.6.4
682	02-13-05	7.3.1.2				
683	02-13-03	7.3.1.3				
684		7.3.1.4				

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
685	02-13-04					
686	02-13-12					
687	02-13-13					
688	02-13-11	7.3.1.5				
689	02-13-10	7.3.1.6				
690		7.3.1.7				
691	02-13-08					
692	02-13-02					
701 to 704	07-11-06					
711		7.3.2.1				
712	02-13-15	7.3.2.4				
713	02-13-18					
714	02-13-16					
715	02-14-01		3-3.2.2.7	6.0.4	4.5	
716	02-14-03					
717		7.3.4.2.5				
718		7.3.4.2.1				
719		8.1.3.9				
720						
721						
722						
723		8.2.2.1				
724		8.2.2.3				
725			2-6.4.1 3-3.2.2.2	6.0.6	4.8	
726			2-6.4.2			
733	07-16-01					
741	(02-13-20)			6.0.1		ISO 3753-4.6.5
751, 752	(09-09-09)		3-3.3.1	(7.0)		
753, 754	02-17-06 08-07-01 to -03		3-3.1.2.6			
755, 756	02-17-07					
757	08-06-01, 02		3-3.3.3.2			
759	06-04-01	11.1.2.5	3-3.3.9.3			
760	08-09-02					
771			3-3.3.5.3			
772			3-3.3.2.5			
773			3-3.3.2.4			

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
774						
775			3-3.3.2.3			
776						
777			3-3.3.2.6			
778						
791 to 796	08-09-02					
801			3-3.3.1.3			
802			3-3.3.1.4			
803			3-3.3.1.5			
831	08-02-14	11.1.2.3	3-3.3.3.7	7.0.0		
832	08-01-01	11.1	3-3.1.1.2	8.0.0	1.4	
833	08-01-02		3-3.1.1.3	8.0.1		
834	08-01-03	(11.1.2.4.3)				
841	02-14-02	11.1.2.1.4, 5				
842	08-08-01					
843	08-08-02					
851	12-52-01					
863	(08-10-03)					
864	08-10-03					
865	08-10-04					
866	08-10-06 to -12					
891, 892	10-15-01, 02; 12-29-01, 02		3-3.1.2.8			
893, 894	10-15-04 11-06-04					
895, 896	06-19-01		3-3.1.2.2			
1011			1-6.1.7			
1021			1-3.5.3			
1022			1-3.5.1			
1041			1-3.2			
1042			4-3.1			
1051 to 1076			1-Table 2-Table			
1081			2-Table, note 4			
1082, 1083						
1084, 1085						
1086			2-Table, note 4			

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
1087, 1088						
1089, 1090						
1091						
1101			1-5.2			
1102						
1103			2-7			
1104			2-7			
2001			3-3.2.2.8	6.0.3	4.4	
2002		5.4.3.6	3-3.2.2.6	6.0.2	4.3	
2003, 2004			3-3.3.7.3	6.0.6	4.8	
2005						ISO 3952-1-2.1.1
2006						ISO 3953-4-9.8.1
2007						
2008	02-12-23					
2009	02-12-17					
2010	02-12-18					
2011	02-12-22					
2012	02-12-21					
2013						
2014, 2015						
2031		5.4.3.7	3-3.5.1.7			
2032						
2033		11.2.4		5.3.4		
2034						
2035						
2036				5.2.5		
2037				5.3.3		
2038					6.2	
2039				4.3.11	6.3	
2040					6.1	
2041						
2042				4.4.4		
2043						
2044, 2045					2.14	
2061		5.3.6.1				
2062, 2063		5.3.6.2; 8.4.2				ISO 3753-4.7.1
2064						

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
2065						
2066						
2067						
2068						
2101	11-03-09		1-3.6 3-3.2.1.1	4.3.0	1.2	ISO 3753-4.6
2102				4.3.1	3.2	
2103				4.3.2	3.3	
2104				4.3.3		
2111				4.3.4	3.4	
2112				4.3.5	3.11	
2113					3.25	
2114						
2115						
2121					3.1 to 3	
2122						
2123					3.23	
2124		9.5.2.1.2			3.22	ISO 3753-4.6.1
2125					3.15	ISO 3753-4.6.3
2126					3.18	
2127						
2128						
2129						
2130						
2131						
2151				5.2.2		
2161		5.3.5.1				
2162		5.4.3.8				
2163		5.3.2.3				
2171		5.4.2.1				
2172		5.4.3.2				
2173		9.3.2				
2174		6.2.2.2				
2175		9.1.1.8				
2176		9.1.1.7				
2177		7.3.4.1.2				
2181				4.3.12	5.6	
2301				4.5.6		

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
2302				4.5.6; 5.3.1		
2303						
2304						
2321						ISO 3753-4.1.1
2322						
2323						ISO 3753-4.1.1.6
2331						ISO 3753-4.1.1.4
2332						ISO 3753-4.1.1.5
2333						
2334						
2335						ISO 3753-4.1.2
2336						ISO 3753-4.1.2.1
2337						ISO 3753-4.1.2.2
2338						
2339						ISO 3753-4.1.2.4
2351						
2352						
2353						
2401		8.1.2.1				
2402		8.1.2.3				
2403						
2404						
2405						
2406		8.1.2.2				
2407						
2408		8.1.3.3				
2409		8.1.3.4				
2410						
2411						
2412						
2413		8.1.3.5				
2414		(8.1.3.5)				
2415		(8.1.3.6)				
2416		8.1.3.6				
2431		8.3.1				
2432		8.3.2				
2433		8.3.2				

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
2434		8.3.2				
2435		8.3.1				
2436		8.3.2.1				
2441	02-13-21	8.2.2.1	2-6.4.5 3-3.2.2.4	6.0.5		ISO 3753-4.6.6
2442	02-13-22	8.2.2.3				
2443		8.2.3.1				
2444		8.2.2.4				
2445		8.2.2.1				
2446		(8.2.2.2)				
2447		(8.2.2.2)				
2448						
2449		8.2.3.1				
2450		8.2.3.2				
2451		(8.2.3.2)				
2501		10.2.2.7		4.5.5; 5.3.5, 6		
2502						
2511						
2512						
2513						
2514						
2515						
2516						
2517						
2518						
2521						
2531						
2532						
2533						
2541				4.5.2, 4.5.3		
2551						
2571						
2572						
2573						
2574						
2575						
2581						

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
2582						
2583						
2591						
2601					5.5	
2602		5.3.1.2		4.5.7	5.4	
2603						
2604						
2605						
2606						
2607						
2608						
2621						
2622						
2623						
2624						
2651						
2661						
2671						
2672						
2673						
2691		10.2.2.6				
2801						
2802						
2803						
2804						ISO 7000-0390
2805						ISO 7000-0194
2806						
2807						ISO 7000-0535
2808						
2809						
2810						
2811						ISO 7000-0303
2812						ISO 7000-0387
2814						
2815						ISO 7000-0268
2816						ISO 7000-0291
2817						ISO 7000-0368

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
2818						ISO 7000-0292
2819						ISO 7000-0384
2820						ISO 7000-0382
2821						ISO 7000-0371
2822						ISO 7000-0365
2823						
2824						
2825						
2826						ISO 7000-0883
2827						
2828						
3001						
3002						
3003	03-04-07					
3004						
3005						
3051	11-03-01					
3052	11-03-02					
3053	11-03-03					
3054	11-03-04					
3055						
3056						
3057						
3058	11-12-01					
3059	11-12-02					
3060	11-12-03					
3061						
3062						
3063						
3064	10-01-04					
3065						IEC 61175
3066						IEC 61175
3067						
3068						
3069						
3081	11-12-05					
3082	11-12-06					

Symbol registration No.	Item in existing International Standard					
	IEC 60617	ISO 1219-1	ISO 3511	ISO 4067-1	ISO R538	Others
3083	11-12-07					
3084						
3085	11-04-03					
3086	11-04-07					
3087						
3101…3124						
3132	07-16-01					
3133…3808						
3821						ISO 7000-0229
3822…3881						

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