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The American Society of Mechanical Engineers

AN AMERICAN NATIONAL STANDARD

GRAPHICAL SYMBOLS FOR DIAGRAMS, PART 1: GENERAL INFORMATION AND INDEXES

ASME Y14.40.1-2002
(Identical to ISO 14617-1: 2002)

Date of Issuance: July 11, 2003

The next edition of this Standard is scheduled for publication in 2007. There will be no addenda or written interpretations of the requirements of this Standard issued to this edition.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

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FOREWORD

This Standard is the adoption as an American National Standard of ISO 14617-1: 2002. The ASME Y14 Standards Committee, Engineering Drawing Practices and Related Documentation, is responsible for this Standard and supervises the United States participation in the ISO Technical Committee 10 activity responsible for the development and maintenance of its counterpart ISO 14617-1 through the U.S. Technical Advisory Group for ISO/TC 10.

This Standard is *identical* to ISO 14617-1: 2002 as that term is defined in ISO/IEC Guide 21: 1999 and is part of a series of standards providing graphical symbols for diagrams in a variety of technical disciplines. The titles in this series include:

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.

Suggestions for improvement of this Standard are welcome. They should be sent to The American Society of Mechanical Engineers, Attention: Secretary, Y14 Standards Committee, Three Park Avenue, New York, NY 10016.

This Standard was approved as an American National Standard on December 19, 2002.

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Engineering Drawing and Related Documentation Practices

(The following is the roster of the Committee at the time of approval of this Standard.)

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GRAPHICAL SYMBOLS FOR DIAGRAMS, PART 1: GENERAL INFORMATION AND INDEXES

1 SCOPE

This Standard 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 two indexes: an alphabetic index and an index of registration numbers, both concerned uniquely with ASME Y14.40.2 to ASME Y14.40.12, 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 ASME Y14.40.0.

2 REFERENCE

The following reference contains provisions that, through reference in this text, constitute provisions of this Standard. The latest edition shall apply.

ASME Y14.40.0, Basic Rules for the Design of Graphical Symbols for Use in the Technical Documentation of Products

Publisher: The American Society of Mechanical Engineers (ASME International), Three Park Avenue, New York, NY 10016; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007

3 TERMS AND DEFINITIONS

For the purposes of this Standard, the following terms and definitions apply.

3.1

function: activity proper to anything, mode of action by which it fulfills 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.

3.4

device: assembly of components to perform a required function.

EXAMPLE: an actuating device, a centrifuge.

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.

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.

3.8

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

4 ARRANGEMENT OF THE ASME Y14.40 SERIES OF STANDARDS

4.1 Domains of Application

The ASME Y14.40 series of standards consists of a number of separate standards (parts) covering graphical symbols for use in most technical fields.

4.2 Subdivision of Parts

Each Standard in this series is divided into sections that each deal with graphical symbols for a particular group of generic products or functions. When appropriate, paragraphs are given subparagraphs, as follows using the example of para. 7 from ISO 14617-2:

Paragraph 7	Directions
Subparagraph 7.1	Symbols of Basic Nature
Subparagraph 7.2	Application Rules for the Symbols in Para. 7.1
Subparagraph 7.3	Symbols Giving Supplementary Information
Subparagraph 7.4	Application Rules for the Symbols in Para. 7.3
Subparagraph 7.5	Application Examples

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

Subparagraph 4.3	Symbols Giving Supplementary Information
Subparagraph 4.3.1	Input and Output Labels
Subparagraph 4.3.2	General Functions
Subparagraph 4.3.3	Mathematical Operations
Subparagraph 4.3.4	Change of Discrete State at Specified Values of a Characteristic Quantity
Subparagraph 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 para. 4.2.1.

When cross-referencing to another part, (standard in this series), the part number is also included.

EXAMPLE 2: A cross-reference to symbol 142 in ASME Y14.40.2 is given as "See 142 (2-4.3.2.28)."

5 REGISTRATION NUMBERS

IMPORTANT: A direct relationship does not necessarily exist among 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

The ASME Y14.40 series 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 ASME Y14.40.3 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 the ASME Y14.40 series have been designed in accordance with the rules given in ASME Y14.40.0. 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 ASME Y14.40.0, 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 (e.g., 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

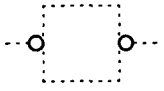
Symbols may be increased in size, for example, in order to allow all terminals to be represented. They may also be reduced in size. In both cases, the original line width shall be maintained.

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 ASME Y14.40.0.

9 LETTERING

For lettering, see ASME Y14.40.0.

10 INDEXES

The alphabetic index 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 can be used to locate a graphical symbol whose registration number is already known.

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.

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-subpara.)	Description
101	2-4.1.1	Complex device, functional unit, equipment, 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	
131	2-4.3.2.17	Transition to a lower quantity level
	11-8.3.2	
132	2-4.3.2.18	Transition to a higher or lower quantity
	11-8.3.3	level
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	
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
173	8-4.3.1.6	Change of state when the characteristic
	2-4.3.4.3	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	
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

Registration number	Location (Part-subpara.)	Description
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
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
246	2-7.1.6	Alternative directions in general, except for energy, propagation, and signal flow
249	2-7.1.7	Direction of propagation, energy, or signal flow (simplex)
250	6-4.3.2	Alternative directions of propagation,
	2-7.1.8	energy, or signal flow (half-duplex)
251	6-4.3.3	Directions of propagation, energy, or
	2-7.1.9	signal flow, simultaneously in both directions possible (full-duplex)
252	6-4.3.4	Transmission
	2-7.1.10	
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
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

Registration number	Location (Part-subpara.)	Description
563	3-8.1.2	Quick-release coupling element of male type
564	3-8.1.3	Quick-release coupling element of female type
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
661	6-6.3.7	Latching device
	4-4.1.17	
	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
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
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

Registration number	Location (Part-subpara.)	Description
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
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
	7-4.1.11	motion of the parts in two or more dimensions
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

Registration number	Location (Part-subpara.)	Description
2037	7-5.1.11	Spray nozzle
	11-4.1.2	
	12-4.1.10	
2038	7-5.1.12	Siphon, anti-siphon trap
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
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
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	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	Positive displacement type
	10-4.3.8	
2322	9-4.3.6	Rotodynamic type
	10-4.3.9	
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	Rotary type, turbine type
	10-4.1.5	Hydraulic motor
2406	10-4.1.6	Pneumatic motor
2407	4-6.1.17	Actuator in the form of a hydraulic motor with alternative directions of flow
	10-4.1.7	Hydraulic motor with alternative directions of flow
2408	4-6.1.18	Actuator in the form of a pneumatic motor with alternative directions of flow
	10-4.1.8	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

Registration number	Location (Part-subpara.)	Description
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	Heating or cooling coil
	11-7.3.6	Heat exchanger type
	12-4.3.7	
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	Fired type
	12-4.3.9	
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 center 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
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
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