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Graphical symbols for diagrams —

Part 2: Symbols having general application

Symbols graphiques pour schémas —

Partie 2: Symbols d'application générale

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Foreword

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

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

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

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

ISO 14617-2 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 2:
Symbols having general application

1 Scope

This part of ISO 14617 specifies graphical symbols of a general character, mainly for use in building-up complete symbols representing specific products and functions in diagrams.

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

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

2 Normative references

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

ISO 31-11:1992, *Quantities and units — Part 11: Mathematical signs and symbols for use in the physical sciences and technology*

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

ISO 14617-3:2002, *Graphical symbols for diagrams — Part 3: Connections and related devices*

ISO 14617-6:2002, *Graphical symbols for diagrams — Part 6: Measurement and control functions*

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

IEC 60617-2:1996, *Graphical symbols for diagrams — Part 2: Symbol elements, qualifying symbols and other symbols having general application*

IEC 60617-13:1993, *Graphical symbols for diagrams — Part 13: Analogue elements*

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
complex device
device consisting of several functionally interrelated components or elements, the description of which needs a diagram

EXAMPLE An automatic star-delta starter; an automatic actuator consisting of a motor, a blocking device, a gear-box, a position switch.

3.2
functional unit
constructional assembly containing functionally interrelated components or devices

[IEC 60050-441]

3.3
input/output label
graphical symbol, letter(s) or number indicating the function of an input/output of a component or device

[IEC 60617-12]

3.4
conversion
change of one form of energy, information or material into another

[IEC 60050-551, IEC 60050-601]

3.5
hysteresis
property of a device whereby it gives different output values in relation to its input values, depending on the directional sequence in which the input values have been applied

[IEC 60050-351]

3.6
stabilizing
function where the influence of other quantities is eliminated or reduced so that the level of an output quantity can be regarded as constant

[IEC 60050-351]

3.7
enabling
making it possible for a function to be performed

[IEC 60617-12]

3.8
compensation
effect to counteract sources of error due to variations in operating conditions

3.9
postponed output function
function where the change of state of an output is postponed until the input signal initiating the change returns to its original state

[IEC 60617-12]

3.10
high/low limitation
function limiting a quantity to be higher/lower than a predetermined value

[IEC 60050-151]

3.11
dead band
threshold
finite range of values within which variation of the input variable does not produce any noticeable change in the output variable

[IEC 60050-351]

3.12
high/low selection
function by which the highest/lowest value is selected

3.13
automatic, adj.
⟨control, operation⟩ self-acting (not needing human intervention)

[IEC 60050-151]

3.14
complex function
function whose characteristic cannot easily be described only by a mathematical expression but needs a description by supplementary text, a graph, a table, etc.

[IEC 60617-12]

3.15
bias
function giving an output corresponding to that portion of an input signal exceeding a predetermined threshold value

[IEC 60050-393]

3.16
reverse function
reverse action
mathematical function $Y = 1 - X$, i.e. when X is 0 %, then Y is 100 %, when X is 100 %, then Y is 0 %

[IEC 60050-351]

3.17
characteristic quantity
⟨measuring device⟩ quantity whose name characterizes the device and its function

EXAMPLE The characteristic quantity for a safety valve is “pressure”; for an overcurrent relay, “current”.

[IEC 60050-446]

3.18
pilot switch
monitoring device actuated in response to specified conditions of a non-electric characteristic quantity

EXAMPLE Pressure, temperature, speed, flow rate or liquid level.

[IEC 60050-441]

3.19
logic negation
condition mainly used with binary logic elements where the logic state 1 (TRUE) is converted to a logic state 0 (FALSE) or vice versa

[IEC 60617-12, IEC 61082-2]

3.20
logic inversion
condition mainly used with binary logic elements where a higher physical level is converted to a lower physical level or vice versa

[IEC 60617-12, IEC 61082-2]

3.21
feedback controller
device in which the control action is made to depend on the measurement of the controlled variable

[IEC 60050-351]

3.22
variability
ability of changing a property

cf. adjustability (3.23) and inherent variability (3.25)

3.23
adjustability
ability to adjust the setting of a component or device

[IEC 60050-371]

cf. variability (3.22)

3.24
pre-set adjustability
ability to adjust the setting of a component or device before normal service

3.25
inherent variability
variability depending on the inherent characteristic of a component or device

[IEC 60050-351]

cf. variability (3.22) and adjustability (3.23)

3.26
reference direction
direction arbitrarily fixed from one point A to another point B

NOTE A flow is considered as positive when its actual direction is from point A to point B. A pressure or voltage is considered as positive when the pressure or potential is higher in point A than in point B.

[IEC 60375]

3.27
correlation indication
graphical symbol indicating correlated directions, polarities, etc.

3.28
stepping
function providing displacement or rotation in steps

3.29
bidirectional
having the property to move, transmit, etc. in two alternative, opposite directions

[IEC 60050-521]

3.30
envelope
tank
gas- or watertight enclosure for ensuring the function of the component of which the envelope or tank is a part

[IEC 60050-531]

NOTE An envelope or tank is a part of a component. The term should not be confused with the outline (periphery) of a graphical symbol.

4 Components, devices, functional units, equipment, plants and functions

4.1 Symbol of a basic nature

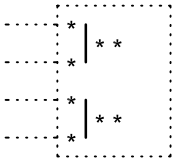
4.1.1	**101**		Complex device, functional unit, equipment, plant, function See R101 (4.2.1).

4.2 Application rules for the symbol in 4.1

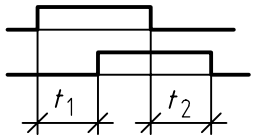
4.2.1	**R101**	The symbol shall be used — when it is not possible or practical to construct a graphical symbol by combining symbols for the constituent parts of a component or device or when a specific symbol for a component or device does not exist, — for functions. The asterisk shall be replaced with information as stated in a) to g) below or shall be omitted if the symbol can be understood without such information, such as by means of input and output labels, see symbol 106 (4.3.1.1). For an example, see X112 (4.5.12). a) Graphical symbol(s) representing the most significant constituent(s). For an example, see X101 (4.5.1). b) Mathematical signs or formulae or both, letter symbols for quantities, chemical formulae, graphs and symbols from International Standards. Mathematical signs shall be in accordance with ISO 31-13. For examples, see X102 (4.5.2) to X105 (4.5.5). c) An abbreviation, preferably mnemonic based on the English language. For an example, see X106 (4.5.6). If the mnemonic is not standardized and its interpretation is not self-evident to a reader of the diagram, the mnemonic used shall be explained on the diagram or in a supporting document. d) Graphical symbols providing supplementary information related to the inputs and outputs in accordance with symbol 106 (4.3.1.1). For an example, see X112 (4.5.12). e) Graphical symbols providing supplementary information related to the assembly as a whole, located inside or outside the solid outline. For examples, see X108 (4.5.8) to X111 (4.5.11). f) If it is impossible to describe the meaning of the graphical symbol by the methods given in a) to e), a short, descriptive text may be added. This text should be written in English, independent of the language or language being used in the diagram. However, for use limited to a defined language region, a different language may be used instead of English. The text may be located inside or outside the box. For an example, see X107 (4.5.7). g) Combinations of methods a) to f). For examples, see X113 (4.5.13) and X114 (4.5.14). Notations according to a) to c) shall be located at the top of the outline and centred horizontally. NOTE The rules above are in accordance with ISO 81714-1. The square-shaped form of the symbol is the basic form. For some items another form is used in ISO 14617.

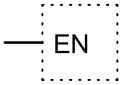
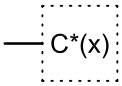
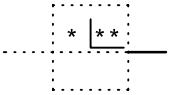
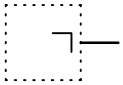
4.3 Symbols giving supplementary information

4.3.1 Input and output labels

4.3.1.1	**106**		Label (shown at two inputs and one output) See R106 (4.4.1).
4.3.1.2	**107**		Label grouping (shown at two groups of inputs) See R107 (4.4.2).

4.3.2 General functions

4.3.2.1	**111**	Form 1 	Conversion See R111 (4.4.3).
4.3.2.2	**112**	Form 2 * / * *	
4.3.2.3	**113**	Form 1 	Conversion without connection between input and output circuits See R111 (4.4.3).
4.3.2.4	**114**	Form 2 * // * *	
4.3.2.5	**115**		Amplification NOTE The triangle is pointed in the direction of transmission.
4.3.2.6	**119**		Magnetic field effect
4.3.2.7	**121**		Proximity effect
4.3.2.8	**122**		Touch effect
4.3.2.9	**123**		Delay t_1 is the switch-on delay, t_2 the switch-off delay. See R112 (4.4.4). Explanation: In Out 

4.3.2.10	**124**		Hysteresis
4.3.2.11	**125**		Stabilizing See R113 (4.4.5).
4.3.2.12	**126**		Enabling input
4.3.2.13	**127**		Compensating input For the use of the symbol, see IEC 60617-13-05-13.
4.3.2.14	**128**		Compensated output See R114 (4.4.6).
4.3.2.15	**129**		Postponed output
4.3.2.16	**130**		Transition to a higher quantity level See R115 (4.4.7)
4.3.2.17	**131**		Transition to a lower quantity level See R115 (4.4.7).
4.3.2.18	**132**		Transition to a higher or lower quantity level See R115 (4.4.7).
4.3.2.19	**133**	Form 1 HLIM	High limitation
4.3.2.20	**134**	Form 2 	
4.3.2.21	**135**	Form 1 LLIM	Low limitation
4.3.2.22	**136**	Form 2 	
4.3.2.23	**137**		Dead band; threshold
4.3.2.24	**138**	HSEL	Selection of highest value
4.3.2.25	**139**	LSEL	Selection of lowest value
4.3.2.26	**140**	COMP	Comparing
4.3.2.27	**141**		Synchronizing

4.3.2.28	**142**	&	Logic AND-function
4.3.2.29	**143**	≥1	Logic OR-function
4.3.2.30	**144**		Automatic operation
4.3.2.31	**145**	ϕ	Complex function See R116 (4.4.8).
4.3.2.32	**148**		Indicating
4.3.2.33	**149**		Registering; recording, printing
4.3.2.34	**150**		Page printing
4.3.2.35	**151**		Facsimile
4.3.2.36	**152**		Perforating
4.3.2.37	**153**		Input by keyboard
4.3.2.38	**154**		Test-point (indication of location)

4.3.3 Mathematical operations

NOTE For the construction of mathematical expressions, see ISO 31-11. However, some expressions are shown here in order to avoid errors, together with some other expressions not found elsewhere.

4.3.3.1	**161**	$\frac{X}{Y}$	Dividing The symbol for division in the form of an oblique line shall not be used, as that symbol is reserved for conversion, see symbol 112 (4.3.2.2).
4.3.3.2	**162**	$X * K$	Bias See R117 (4.4.9).
4.3.3.3	**163**	$1 - X$	Reverse

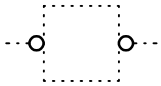
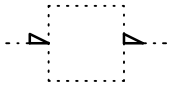
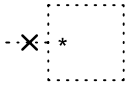
4.3.4 Change of discrete state at specified values of a characteristic quantity

NOTE For the asterisks, see R115 (4.4.7).

4.3.4.1	**171**	* >	Change of state when the characteristic quantity passes a set value from below, for example, in a safety valve or an overpressure pilot switch. See R121 (4.4.10).

4.3.4.2	**172**	* <	Change of state when the characteristic quantity passes a set value from above, for example, in a vacuum valve or an undertemperature pilot switch. See R122 (4.4.11).
4.3.4.3	**173**	* ≥	Change of state when the characteristic quantity passes an upper set value from below or a lower set value from above, for example, in a pilot switch for over- and undertemperature.
4.3.4.4	**174**	* =	Change of state when the characteristic quantity is equal to a set value.
4.3.4.5	**175**	* ≈	Change of state when the characteristic quantity is approximately equal to a set value.

4.3.5 Logic negation, logic inversion, inputs and outputs for auxiliary power supply

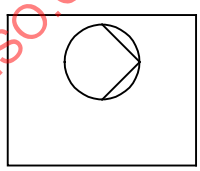
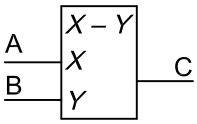
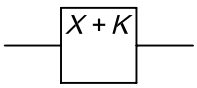
4.3.5.1	**181**		Logic negation (shown at an input and an output)
4.3.5.2	**182**		Logic inversion (shown at an input and an output)
4.3.5.3	**183**		Input or output for auxiliary power supply See R123 (4.4.12).

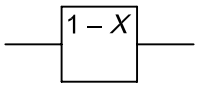
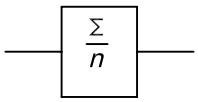
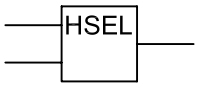
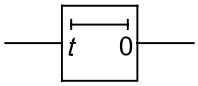
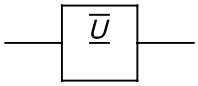
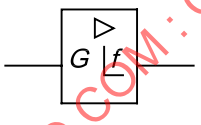
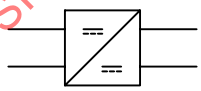
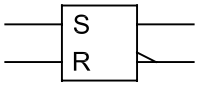
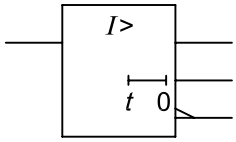
4.4 Application rules for the symbols in 4.3

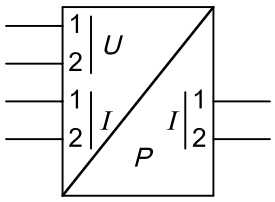
4.4.1	**R106**	The asterisks (input or output labels) shall be replaced with a letter symbol for a quantity (variable) or any other appropriate indication. For examples, see X112 (4.5.12) and X113 (4.5.13). Input and output labels used in symbols for functions according to ISO 14617-6 shall instead be located outside the symbol outline. Non-standardized additional information related to an input or output label may be shown, provided that this information is placed within square brackets, for example, [ODD].
4.4.2	**R107**	The label grouping symbol may be used to simplify the indication of input or output labels for adjacent and associated inputs or outputs whose labels are partially alike. The common portion of these labels (**) shall be placed only once at the inner side of the symbol, whereas the individual portions (*) shall be placed on the outer side. For an example, see X114 (4.5.14). If the individual portions are numbers, intermediate numbers within consecutive groups may be omitted.
4.4.3	**R111**	The asterisk shall be replaced with the letter symbol or characteristic for the input quantity or shall be omitted, while the double asterisk shall be replaced with one or the other for the output quantity or shall be omitted. For an example, see X111 (4.5.11). In form 2, the input quantity shall be shown to the left and the output quantity to the right even if the symbol for the component or device is mirrored.

4.4.4	**R112**	If only switch-on delay occurs, t_2 shall be omitted or replaced with 0. If only switch-off delay occurs, t_1 shall be omitted or replaced with 0. If $t_1 = t_2$, the notation may be replaced with the letter t centred. For an example, see X108 (4.5.8). The notations may be replaced with the actual values. If the delay type is obvious, the notations may be left out.
4.4.5	**R113**	The asterisk shall be replaced with the letter symbol for the stabilized output quantity. For an example, see X109 (4.5.9).
4.4.6	**R114**	The asterisk shall be replaced with the letter symbol for the quantity compensated. The double asterisk shall be replaced with the letter symbol or symbols for the quantity or quantities for which the component or device is compensated, or else shall be omitted. For an example, see X110 (4.5.10).
4.4.7	**R115**	The asterisk shall be replaced with the letter symbol for the quantity or shall be omitted.
4.4.8	**R116**	The Φ shall be supported by an indication of the function or a reference to an explanation. This information shall be stated within square brackets, for example, [Table 1].
4.4.9	**R117**	The asterisk shall be replaced with +, –, or ±, depending on the type of bias.
4.4.10	**R121**	When the symbol is used to qualify an output, the notations >H and >HH or >H2 may be used to indicate two outputs changing state when the characteristic quantity passes two different set values from below.
4.4.11	**R122**	When the symbol is used to qualify an output, the notations >L and >LL or >L2 may be used to indicate two outputs changing state when the characteristic quantity passes two different set values from above.
4.4.12	**R123**	The asterisk shall be replaced with a letter symbol for the quantity (e.g. p for pressure and U for voltage) and a polarity sign, the rated value (e.g. + 5V), a suitable mnemonic (e.g. VCC and GND), or shall be omitted.

4.5 Application examples

4.5.1	**X101**	 101, 2301	Pumping system containing one or more pumps and associated components, for example, valves, filters and controls.
4.5.2	**X102**	 101, 106	Subtraction function component
4.5.3	**X103**	 101, 162	Bias function component

4.5.4	**X104**	 101, 163	Reverse function component
4.5.5	**X105**	 101	Averaging function component
4.5.6	**X106**	 101, 138	Component selecting the highest input signal as output signal
4.5.7	**X107**	 101	Hydraulic controlling unit
4.5.8	**X108**	 101, 123	Delay element with switch-on delay
4.5.9	**X109**	 101, 125	Voltage stabilizer
4.5.10	**X110**	 101, 115, 128	Amplifier with gain compensated for frequency variations
4.5.11	**X111**	 101, 111, 221	DC to DC converter
4.5.12	**X112**	 101, 106, 182, IEC	RS-bistable element
4.5.13	**X113**	 101, 123, 171, 182	Overcurrent relay with one instantaneous output, one delayed output and one instantaneous, logically inverted output.

4.5.14	**X114**	 101, 107, 111	Signal converter with voltage and current inputs and current output representing the electric power ($P = U \cdot I \cdot \cos\phi$ in the case of single-phase alternating current). The output signal is a current proportional to the power.

5 Variability

5.1 Symbols of a basic nature

NOTE For the location of the symbols, see R201 (5.2.1).

5.1.1	**201**		Adjustability
5.1.2	**202**		Non-linear adjustability
5.1.3	**203**		Pre-set adjustability
5.1.4	**204**		Inherent variability
5.1.5	**205**		Non-linear inherent variability

5.2 Application rules for the symbols in 5.1

5.2.1	**R201**	The symbol should cross the centre of the symbol to which it is added. For examples, see X201 (5.5.1) to X206 (5.5.6). However, if this symbol consists of an outline in the form of a square, rectangle or circle and a symbol inside indicating the function, another location could be more appropriate. For an example, see X207 (5.5.7).

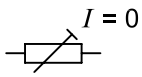
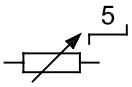
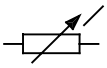
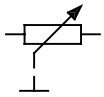
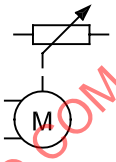
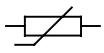
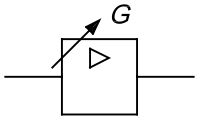
5.3 Symbols giving supplementary information

5.3.1	**211**		Stepwise variability See R211 (5.4.1) and R212 (5.4.2).
5.3.2	**212**		Continuous variability See R211 (5.4.1).

5.4 Application rules for the symbols in 5.3

5.4.1	**R211**	The symbol shall be located adjacent to symbols 201 (5.1.1) to 205 (5.1.5). For examples, see X202 (5.5.2) and X203 (5.5.3).
5.4.2	**R212**	The asterisk shall be replaced with technical data, for example, the number of steps, or shall be omitted. For an example, see X202 (5.5.2).

5.5 Application examples

5.5.1	**X201**	 203, IEC	Resistor with pre-set adjustability. Adjustment permitted only when the current is zero.
5.5.2	**X202**	 201, 211, IEC	Resistor with adjustability in five steps
5.5.3	**X203**	 201, 212, IEC	Resistor with continuous adjustability
5.5.4	**X204**	 201, 404, 681, IEC	Resistor with manual adjustability
5.5.5	**X205**	 201, 404, IEC, IEC	Resistor with electric-motor-operated adjustability
5.5.6	**X206**	 205, IEC	Resistor with non-linear inherent variability
5.5.7	**X207**	 101, 115, 201	Amplifier with adjustable gain

6 Characteristics for force, motion, mass flow, magnetic flow and signals

6.1 Symbols of a basic nature

6.1.1	**221**	Form 1  200 %	Constant force, motion or flow For form 2, see R221 (6.2.1).
6.1.2	**222**	Form 2 200 %	
6.1.3	**223**	 200 %	Approximately constant force, motion or flow
6.1.4	**224**	 200 %	Sinusoidal force, motion or flow See R222 (6.2.2).
6.1.5	**225**	 200 %	Pulse-shaped force, motion or flow
6.1.6	**226**	 200 %	Burst of sinusoidal flow
6.1.7	**227**	 200 %	Saw-tooth shaped force, motion or flow
6.1.8	**228**	 200 %	Oscillating motion NOTE The graph shows the relation between time and angle.
6.1.9	**229**	 200 %	Positive-going pulse
6.1.10	**230**	 200 %	Negative-going pulse
6.1.11	**231**	 200 %	Positive-going step
6.1.12	**232**	 200 %	Negative-going step
6.1.13	**233**		Stepping function
6.1.14	**234**		Analogue signal

6.1.15	**235**	#	Digital signal
6.1.16	**236**	BIN	Binary signal

6.2 Application rules for the symbols in 6.1

6.2.1	**R221**	Form 2 may be used if no confusion is likely.
6.2.2	**R222**	The symbol may be drawn twice or three times, with the repeated symbols placed one above the other, to indicate a higher frequency range relative to that indicated by a single symbol.

6.3 Symbol giving supplementary information

None.

6.4 Application rule for the symbol in 6.3

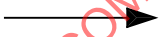
None.

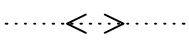
6.5 Application example

None.

7 Directions

7.1 Symbols of a basic nature

7.1.1	**241**	Form 1  200 %	Direction in general, except for energy and signal flow, for example: — force; — rectilinear motion; — mass flow (solid material or fluid); — magnetic flow; — sound. For form 1, see R241 (7.2.1), R242 (7.2.2) and R244 (7.2.4). For form 2, see R243 (7.2.3) and R244 (7.2.4).
7.1.2	**242**	Form 2  200 %	
7.1.3	**243**		Working direction of hydraulic power See R245 (7.2.5).
7.1.4	**244**		Working direction of pneumatic power See R245 (7.2.5).

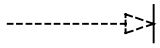
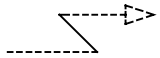
7.1.5	**245**	Form 1	Alternative directions in general, except for energy and signal flow, for example: — force; — rectilinear motion; — mass flow (solid material or fluid). For form 1, see R241 (7.2.1). For form 2, see R243 (7.2.3).
7.1.6	**246**	Form 2	
7.1.7	**249**		Propagation, energy, or signal flow (simplex) See R247 (7.2.6).
7.1.8	**250**		Propagation, energy, or signal flow, alternative directions (half-duplex) See R247 (7.2.6).
7.1.9	**251**		Propagation, energy, or signal flow simultaneously in both directions possible (full-duplex) See R247 (7.2.6).
7.1.10	**252**		Transmission See R247 (7.2.6).
7.1.11	**253**		Reception See R247 (7.2.6).
7.1.12	**254**		Circular motion, unspecified direction See R248 (7.2.7)
7.1.13	**255**		Circular motion See R248 (7.2.7) and R249 (7.2.8).
7.1.14	**256**		Circular motion, alternative directions See R248 (7.2.7) and R249 (7.2.8).

7.2 Application rules for the symbols in 7.1

7.2.1	**R241**	The symbol shall be shown adjacent to the symbol for the related component without crossing any symbol.
7.2.2	**R242**	The symbol may also represent the *reference direction* of force, rectilinear motion, or flow. When the symbol indicates the reference direction for pressure in a diagram the arrow shall point from the higher to the lower potential. In this application it may be slightly bent.
7.2.3	**R243**	The symbol shall be shown on the symbol for the flow path. For examples, see X242 (7.5.1) and X243 (7.5.2).
7.2.4	**R244**	When necessary, the quantity or other information shall be shown adjacent to the symbol.

7.2.5	**R245**	In simplified representation, the symbol may represent a fluid power source. For an example, see X246 (7.5.3).
7.2.6	**R247**	The symbol shall be shown on the connecting line and located such that it does not touch any symbol. The symbol may also be used to indicate the transfer direction of a component or device, in which case the symbol should be located on the outline of the basic symbol.
7.2.7	**R248**	The symbol may be drawn twice, with the two representations located adjacent to one another, to indicate a higher speed compared to that indicated by a single symbol. For an example, see X249 (7.5.4).
7.2.8	**R249**	The symbol shall cross the symbol for the mechanical link and be interpreted as if it were located in front of the mechanical link. For examples, see X249 (7.5.4) and X250 (7.5.5). Alternatively, the symbol may be shown adjacent to the symbol for the components that the link connects. For an example, see X251 (7.5.6). In order to avoid confusion between the two alternatives, in the first method, the symbol should be located at a sufficient distance from the two symbols representing the components connected. In the second method, the symbol should be located such that it does not cross the symbol for the mechanical link.

7.3 Symbols giving supplementary information

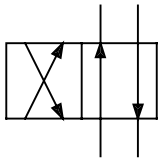
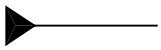
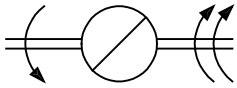
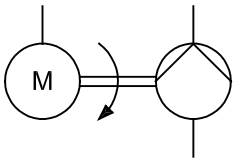
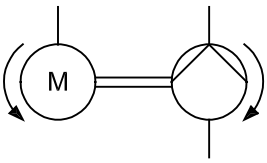
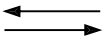
7.3.1	**261**	 200 %	Limit See R251 (7.4.1).
7.3.2	**262**	 200 %	Momentary and partial reversal of motion For an example, see X258 (7.5.13).
7.3.3	**263**		Correlation indication See R252 (7.4.2).

7.4 Application rules for the symbols in 7.3

7.4.1	**R251**	The symbol shall be used to indicate a stop in an extreme position, for an example, see X253 (7.5.8), a stop in an intermediate position, for an example, see X254 (7.5.9), a stop with automatic re-start (dwell) in an intermediate position, for examples, see X255 (7.5.10) and X256 (7.5.11), and a stop with automatic re-start (dwell) in an extreme position, for an example, see X257 (7.5.12).
7.4.2	**R252**	The symbol shall be used to indicate the correlation between directions of motions, polarities or flow directions. For examples, see X260 (7.5.14) and X261 (7.5.15).

7.5 Application examples

7.5.1	**X242**	 242, 405	Direction of mass flow in a pipeline

7.5.2	**X243**	 242, 2161, 2171	Direction of mass flow in a valve
7.5.3	**X246**	 243, 405	Hydraulic power source, simplified representation
7.5.4	**X249**	 255, 402, 2008	Mechanical gear pair with rotational speed higher on the output side (clockwise) than that on the input side (anticlockwise)
7.5.5	**X250**	 255, 402, 2301, IEC	Electric motor and pump, the motor rotating anticlockwise, the pump clockwise Two methods are shown.
7.5.6	**X251**	 255, 402, 2301, IEC	
7.5.7	**X252**	 241	Reciprocating motion
7.5.8	**X253**	 256, 261	Limited circular motion in alternative directions
7.5.9	**X254**	 241, 261	Rectilinear motion with intermediate stop, manual re-start from the stop
7.5.10	**X255**	 241, 261	Rectilinear motion with intermediate dwell, automatic re-start after a specified time
7.5.11	**X256**	 245, 261	Rectilinear motion in alternative directions with intermediate dwell; automatic re-start after a specified time in each direction
7.5.12	**X257**	 241, 261	Rectilinear motion in the direction of the arrow pointing to the right and back in the opposite direction with dwell at the return point
7.5.13	**X258**	 241, 262	Rectilinear motion in the direction of the arrow with partial reversal in an intermediate position